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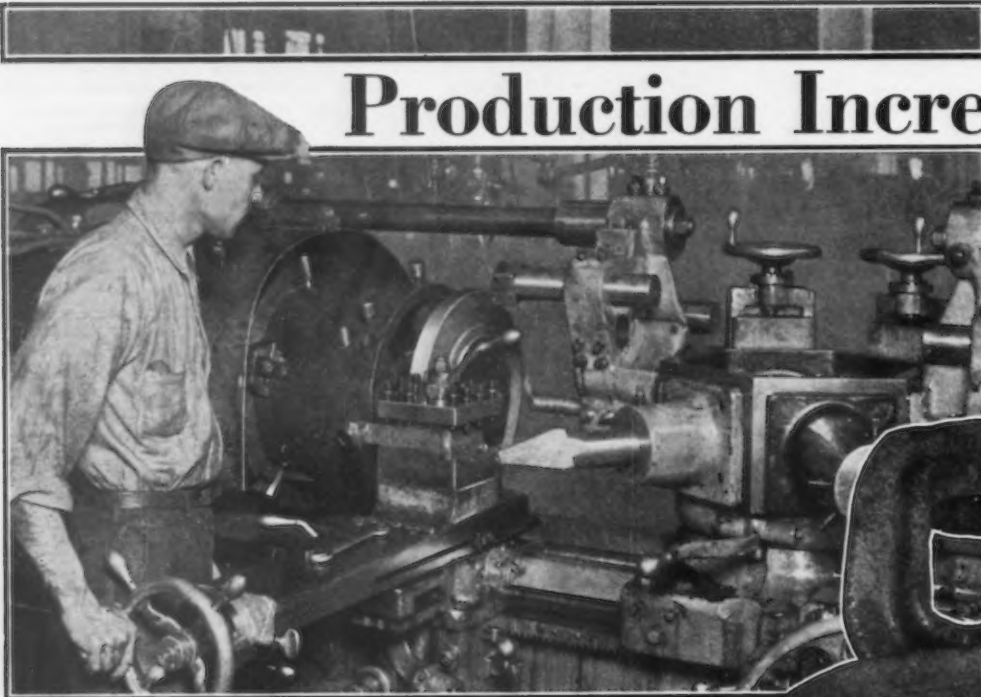
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Production Increased

71%

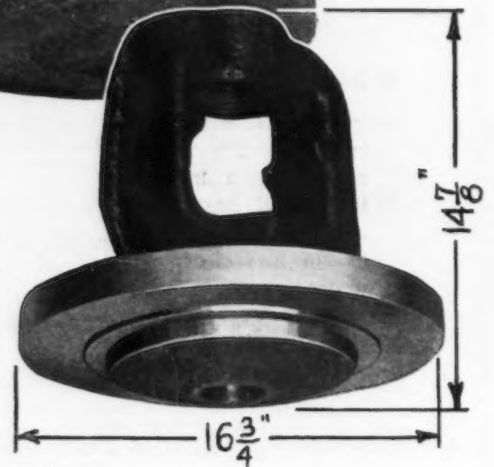
Valve Bonnet
Weight 190 lbs.

12 Valve Bonnets a day instead of 7

THIS production increase tells the story why THE EDWARD VALVE & MFG. CO. replaced a vertical turret lathe with a W & S 4-A Turret Lathe on this job.

Like many other machines that are still in service, this replaced machine in the Edward's plant was apparently doing its work satisfactorily. A study showed, however, that the W & S Turret Lathe would quickly pay for itself and proved that another serviceable machine was now obsolete.

If you are in doubt as to whether it will pay you to replace any of your machines you are now using, our engineers will be glad to help you check this over. Write us.



This booklet gives a complete description of the Edward's job. If you have not received a copy send for it.

The Warner & Swasey Company

Cleveland, Ohio

THE IRON AGE

New York, February 21, 1929

ESTABLISHED 1855

VOL. 123, No. 8

Manufacturing Budget Controls

Inventory of Stock and Parts in Process Tied in With
Analysis Which Is Revised Monthly—Delays
and Over-Supply Avoided

BY KENNETH M. COGGESHALL*

BECAUSE of the variety of products manufactured by the Wagner Electric Corporation, St. Louis, it is necessary to adapt part of the plant to mass production, another part to the manufacturing of specific orders, and still a third part to a combination of both mass production and custom order work. Under such conditions, the control of packed stock, in process of inventory, and purchase of raw material presents a most interesting problem. The solution of this problem is simplified through the use of a manufacturing budget, which is the key to the entire system of controlling stocks and materials.

Mass production is the result of a continuous demand for a product, or the anticipation of future sales. This demand, as indicated by the sales budget, may fluctuate with the seasons or with the consumers' requirements. In preparing the manufacturing budget, the production department considers not only the necessity of providing the volume called for by the sales estimate at the designated time, but also the possibility of producing the required quantity at an economical cost.

Thus, an average demand must be determined and the factory schedules so laid out that the assembly line will continue at a constant rate of production. At intervals a heavy stock of completed units will accumulate, which will later be absorbed during the period when shipments are made at a rate in excess of the production schedule. In like manner, the capacity of the machine tools must be compared with the peaks of the sales demand, so that a stock of machined parts may be provided in advance, if necessary.

*Production manager Wagner Electric Corporation, St. Louis

REDUCTION in costs, through eliminating delays and lost motion, is a primary object in establishing a manufacturing budget control system. But it has a further large value. As delays in manufacturing are avoided, so are the erstwhile resultant delays in shipping goods to customers. This lessens complaints and irritation and tends to hold business which otherwise might seek a new source of supply. For such reasons an authoritative article like the present one, on how a budget control system can be made to work satisfactorily, should be of general interest.

The foundation of a manufacturing budget, covering continuous production, is an accurate forecast of future sales. Such forecasts must be based upon existing contracts for delivery of the product, possibilities for new business, the seasonal trend in the industry and general business conditions. Because of the large inventories involved, the budget covering mass production must be given careful consideration and thoughtful review before approval.

Basis of Analysis to Guide Production

A machine-posted record of contracts and orders received, shipments, production and packed stock available is maintained by the production department. Existing shipping schedules are available, also, to complete the analysis of the production requirements. All record sheets calling for the same item or assembly built for stock or immediate shipment, regardless of customers, are grouped. Behind these is a control sheet, giving a summary of all orders on hand, all shipments made to date, the quantity produced in the shop each day, and the available packed stock.

Although these control sheets are posted daily, they usually are not used for budget purposes except at the close of the month. At this time the sales organization presents an estimated shipping schedule, covering a 90-day period, for those customers who do not have open orders or schedules posted on the control sheets. Digesting this information and setting a manufacturing budget and production schedule is a function of the production department.

As previously stated, the summary of the various shipping releases is not always used as a manufacturing sched-

It is well to know to what extent the "schedule plus stock" quantity will be covered by customers' orders. For this reason, provision is made for posting this information on the right side of the sheet. Where assemblies have special features peculiar to the requirements of a particular customer, it is doubtful if it is wise to permit the "schedule plus stock" quantity to exceed the "unfilled orders." Such items are carefully analyzed before the authorization is presented, for approval, to the vice-president in charge of manufacturing.

Having determined the production schedule, it is posted on a material authorization sheet, similar to Fig. 3. To the "production this year" are added the schedules for the next three months. From this total is subtracted the

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the engineering department. The material control division is interested in knowing the name of each part required, its drawing number, the quantity required for each assembly, the size, kind and weight of raw material to be used and, finally, whether the part is to be manufactured in our plant or purchased from outside suppliers.

Purchase Orders Made from Ledger Record

Using the engineering specifications and the manufacturing budget as the basis of ordering material, purchase orders are issued. A unique method of speeding up material ordering is used. Fig. 6 illustrates the front side of the production department's record of materials. This sheet contains all information needed by the purchasing department in writing the purchase order.

When the quantity required is noted in the "ordered" column, the schedule is posted and approved by the supervisor, the sheet is removed from the ledger and passed to the purchasing agent as a requisition. After the purchase order has been issued, its "P. O. Number" is noted opposite the quantity, and the sheet is returned to the ledger. Thus, the necessity for issuing individual requisitions to cover material requirements is eliminated, with the added advantage of having a complete record on one sheet.

In issuing the purchase orders, the supplier's shipping schedule is specified. This schedule is carefully arranged so that material will always be available to meet the manufacturing budget. For mass production the schedule of incoming material is exceedingly important. If set too high, then the material will pile up ahead of the first operation machines; if too low, production delays will result. But even if the schedule is set correctly, the supplier may ship ahead of time or neglect to meet the specified delivery dates. Hence a constant follow-up of each purchase order is essential.

How Follow-Up System Is Operated

Therefore, for each important material or part ordered, a follow-up sheet, Fig. 7, is used. This sheet is inserted in a Kardex file for easy reference. Shipments ("invoiced") and receipts of material are posted daily and compared with the set schedule. A system of signals indicates whether the supplier is meeting the requirements of the budget.

If irregularities in meeting the schedules are experienced, the follow-up man immediately corresponds with the supplier. Failing to obtain the desired action, the difficulty is referred to the purchasing agent for adjustment. Whenever the schedule permits, material is speci-

REQUEST FOR MATERIAL AND WORK ORDERS
DIVISION _____
MARK ALL WORK ORDERS—NEEDED
SHEET _____ DATE _____ SIZE _____ QUANTITY ORDERED _____ MECH. SHEET NO. _____ PRODUCTION NUMBER _____ Q. K. _____
NAME OF PART _____
CUSTOMER'S NAME _____ ASSEMBLY NUMBER _____
MATERIAL _____ SIZE OR PATTERN NUMBER _____ WEIGHT _____
PROMISE _____
G. O. _____
BUY OUT MATERIAL ORDERED _____
ROUTING _____

PARTS ASSIGNMENT RECORD
YEAR _____ ORDER POINT _____ WTL PER 100 _____
SHEET _____ ORDER QUANTITY _____ MATERIAL _____ L. SPEC. _____
NAME OF PART _____ TYPE _____ PATTERN DRAWING _____
MACH. DRAWING _____
ROUTING _____
WORK ORDERS _____ ASSIGNMENT _____
DATE _____ PRODUCTION NUMBER _____ QUANTITY ORDERED _____ DATE COMPLETED _____ QUANTITY COMPLETED _____
DATE _____ AUTHORIZATION _____ QUANTITY ASSIGNED _____ BALANCE AVAILABLE _____
DATE _____ AUTHORIZATION _____ QUANTITY ASSIGNED _____ BALANCE AVAILABLE _____
AUTHORIZATION SYMBOLS: GENERAL ORDERS—G. O. STOCK RELEASE—STK. WORK ORDER ISSUED—W. O. SERVICE AND SCRAP—S. OVER RUN WORK ORDER—O. R. UNDER RUN WORK ORDER—U. R.

WORK ORDER
JOB NO. _____ TYPE & SIZE _____ DRAWING NO. _____ ASSEMB. NO. _____ DATE ORDERED _____ PROD. NO. _____
DEPT. NO. _____ EQUIPMENT NO. _____ DATE WANTED _____ DELIVER TO _____
QUANTITY ORDERED _____ PART TO BE MADE _____
MATERIAL TO BE USED _____ QUANTITY OR WEIGHT _____
ITEM _____ SIZE _____ L. SPEC. _____ DRAWING NO. _____
FOR OPERATIONS AND ROUTING OF PARTS REFER TO OPERATION SHEETS
WRITTEN BY _____ RECORD ALL DELIVERIES ON REVERSE SIDE. PLEASE RETURN THIS ORDER TO THE PRODUCTION DEPT. WHEN COMPLETED.

MATERIAL REQUISITION
JOB NO. _____ TYPE & SIZE _____ DRAWING NO. _____ ASSEMB. NO. _____ DATE ORDERED _____ PROD. NO. _____
DEPT. NO. _____ EQUIPMENT NO. _____ DATE WANTED _____ DELIVER TO _____
QUANTITY ORDERED _____ PART TO BE MADE _____
MATERIAL TO BE USED _____ QUANTITY OR WEIGHT _____
ITEM _____ SIZE _____ L. SPEC. _____ DRAWING NO. _____
PURCHASE ORDER NO. _____ RECEIVED REPORT NO. _____
WRITTEN BY _____ DRAFTED BY _____ G. K. _____

fied to come forward in carload lots. Light-weight material or parts usually are shipped daily or weekly, to assure a continuous flow to first operation machines.

Purchase and control of material required to meet a mass production schedule are not difficult if close attention is given to the requirements of the manufacturing budget. But the maintenance of an adequate, yet economical, inventory of material for small-lot production or for special orders calls for a more elaborate system. There are certain fundamental materials common to many assemblies of a given type and size. Such material is provided to meet the requirements of a semi-monthly shop order budget. In this system, the issuance of shop orders and the purchase of material are closely related.

Semi-monthly, a new material and shop order release is issued for each division not working on mass production. This authorization is based upon the stock and sales budget previously mentioned, material being purchased and shop orders issued in whatever quantities are necessary to keep pace with the budget requirements. The authorization is written in terms of sets of parts required for each type of product mentioned, and shows:

- a.—Total quantity of each type for which material is provided.
- b.—Uncompleted assembly orders in shop.
- c.—Sets of parts available for new business.
- d.—Average weekly sales (taken from sales budget).
- e.—Additional sets of parts authorized.

Before determining the number of sets of parts of each rating for which material and shop orders are to be authorized, a study is made of the relation between average sales demand and the sets of parts available for new business. For certain classes of product, experience has indicated just what inventory in terms of weeks' supply is economical and necessary. This varies, in departments not concerned with mass production, from five to nine weeks. In a few instances the period is longer, especially on slow-moving ratings in the larger sizes.

It must also be mentioned that, in several shop divisions, these authorizations are so detailed that the different classes of parts and materials are released in varying quantities. Small parts will be released less often, but in large production quantities. Quick delivery shop items, not requiring expensive setups, will be released in small quantities.

In each instance the authorization indicates the quantity available, so that a new lot is not released until the proper low limit has been reached. The point to be emphasized here, however, is that these authorizations are based entirely upon the budget requirements so that, in general, the inventory will fluctuate with the sales demand.

Keeping Track of Parts as Used

For every part produced there is a ledger sheet or parts assignment record. The authorization is posted on these sheets, as shown in Fig. 8, and the necessary work orders are issued. As assembly orders are sent to the shop, they are passed over this record so that a parts assignment can be made. A new balance is then shown.

It is this "balance available" that is reported when a new authorization is to be considered. If this balance becomes alarmingly low between authorization periods, a special request is made to cover up the shortage. At the bottom of the record sheet will be noticed certain symbols, which are used to designate transactions. For instance, service requisitions or scrap, properly reported, constitute a sufficient authorization to replace parts thus absorbed.

In an effort to speed up the handling of special jobs, an order clerk determines what parts and materials are needed at once and makes his request known through the use of a request sheet, Fig. 9. This sheet, when filled in, gives a complete picture of the material requirements of the special jobs; it is made in triplicate. The first copy is used in the office for the completion of the paper work, i.e., work orders and material purchases. The second copy is used by the shop production man in following the job. The third sheet is passed on to the foreman, who later uses it as a requisition to withdraw the parts from the stockrooms, when he is ready to assemble the job.

The shop or work order forms are so designed that the second copy can be used as a requisition for raw material. The third copy is yellow and, as an identification card, accompanies the material on its return to the shop. No foreman is permitted to write requisitions for raw material, since

every order issued to the shop has material reserved for it. This tends to prevent delays and confusion due to lack of material after the job has been put into production. Route tags accompany all shop work orders.

QUAN. DELIVERED TO STORE ROOM		
INSPECTOR	INSPECTOR	INSPECTOR
OUT	OUT	OUT
1 DEPT.	2 DEPT.	3 DEPT.

Fig. 11. In General, a Work Order Covers Operations Performed in but One Division of the Factory. If the material must move to a second or third department, the route card becomes the work order

Lightness and Strength in Aluminum Furniture

Aluminum furniture is so light that general office chairs weigh less than 8 lb., and massive swivel chairs weigh only 27¼ lb. Combined with lightness there is also strength, immunity to ordinary wear, attractiveness and resistance to fire, according to a writer in *Metal Industry*, London. The sheet, tubing and extruded shapes used in the frames are made of an aluminum alloy, heat-treated after fabrication. Strengths up to 60,000 lb. per sq. in. with adequate elongation are available. After being formed in dies, the parts are assembled, and either welded or connected by a mechanical joint designed to develop the full strength of the sections. The completed frames are again heat treated to produce maximum stiffness and resistance to surface denting.

The aluminum frames, according to the author, are sand-blasted to remove oxides, and to make impressions having re-entrant angles that will hold the priming coat firmly to the surface. A pigmented linseed oil-base varnish is sprayed on the work and subsequently treated to a temperature sufficient to insure a firm bond. After surfacing, two coats of enamel are baked on and rubbed between operations. The resulting hard elastic finish resists both chipping and abrasions, declared to be proved by actual usage. Seats, back and arm rests are mounted on separate aluminum frames which are held in place by hidden screws.

Inspection of Molds in the Making

Foundry Management Simplified by Periodic Inspection of Work in Process—How It Saves Spoilage and Takes Little Time

BY PAUL R. RAMP*

WHAT one may know about the foundry business, or any other business, is of little value if one cannot impart it to others. In a man's brain there may be stored a fortune in ideas and methods relative to his vocation, which he has accumulated by years of experience, that would be of great value to the world could they be classified and put in the form of a text book, so that the rising generation might read and profit by them. It would not only enable his readers to profit from his successes, but they would receive still more valuable lessons from his mistakes. It is mistakes and failures that have taught him how to do things right. Unfortunately, if such a book were published, only a small percentage of the great number engaged in the same occupation would read it, and the author would not include his list of failures, but rather only his successes.

So the problem today is to devise a plan which will give us the benefit of all that is of value which we know is stored in the minds of some one who has given almost a lifetime to the problems that confront us, and which we are called upon to solve.

In the foundry we have many problems that are handled in various ways with good results. For instance, a foundry producing a "specialty" accomplishes the desired results by standardizing its methods. In such cases it is possible for the master mind to develop a standard foundry practice for the "molding," "casting" and "cleaning" of certain castings of close similarity. It is possible to specify every detail connected with the work, regardless of how small it is. And this work is often so well done that, if the instructions are followed closely, nothing but a perfect casting can be the result; because the ideas and methods stored in the brains of those who have learned the many tricks of the trade, through actual practice, or through successes and failures, can be drawn upon to help. And this in a large measure accounts for the wonderful progress made in the "Specialty Foundry" today.

Little Repetitive Work in Jobbing Shops

This is not true in "Jobbing Foundries." Not so much has been done here because we have a very different problem. The great variation of work and the small number of similar pieces required prohibit the purchasing of special equipment that would naturally tend to standardize the work, and also prohibit the writing of a standard for every different piece of work. It would be impossible, on

account of the time limit usually imposed, the price paid for the work, and the small value of the standard written after the job was finished, owing to the remote possibility of its ever coming into the foundry again.

Now we cannot standardize our jobbing work except in a few cases, but we want the benefit of men's experience

who have spent years in the jobbing foundry business to apply to every important piece of work we do. The question then is to secure the man who has had a wide experience in what we will call the jobbing foundry business and one, who, we have every reason to believe, is qualified to cope with every emergency characteristic of this branch of the trade.

After we have secured this brain, the next thing is to learn how to inject one man's knowledge into every job in the shop. We know that he can cover but a limited territory in one day, and that he cannot direct every individual job personally. But we also know that he has the experience which will help us reduce our mistakes and losses, and if we can plan our work so that he can apply this knowledge to every job, we will come a great deal closer to the ideal condition desired in the jobbing foundry or the foundry making large, intricate castings of great variation in character.

There is but one solution to this problem, which is a "Scientific Planning Department." This planning department should do more than plan the flow of work through the shop. To secure the best results, and a complete check on the quality of the work in process, a system of periodic inspections is arranged as follows:

When an order is issued to the foundry for a casting, it is accompanied by an inspection card. This card specifies at what stage of the work the foundry superintendent desires to inspect the mold, and the foreman and workmen are instructed not to proceed further until the work has been inspected and released. If the work is satisfactory, the superintendent will sign the inspection card opposite the period inspection number, and allow the molder to proceed. If the work is not satisfactory, he will order the necessary changes made before any work toward the next inspection period is done.

The planning department secures from the superintendent the information that enables him to specify the inspection period, and in turn instructs the men working on the job to notify their foreman when they are ready to have their work inspected. This periodic inspection is a simple matter and generally requires only a few

*Superintendent Foundry and Pattern Shop, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

moments of the superintendent's time, to make the inspection and to order the necessary changes, if any. The important thing is—the mold has been inspected and the proper instructions given right at the time it will do the most good, *by one who knows*.

Inspection Takes Little Time

Consider the difference in the time consumed in standing around a man, waiting for him to get his work to the vital point so that one is sure he does some certain part of it right. Then consider the few moments consumed if called when the work is ready for inspection. In addition to the time saved, the possibility of the workman getting by this vital point and taking chances that might result in a bad casting is avoided.

Molding is a peculiar trade. Most of the work done is covered up and cannot be checked, like other work, consequently the only way to be safe is to inspect the work while it is being done, and to do this inspection periods must be specified. It is too late after the casting is in the scrap pile; anyone can tell then how it all happened.

Some may feel that a plan of this kind would work a hardship on the superintendent, and keep him running all around the shop, inspecting molds and signing cards. This is a mistake, because the inspection is confined to molds that require expert advice, and the mold is inspected only at certain intervals when the work has reached the point where the nature of further procedure would have a great influence on the quality and cost of the casting. It is at this time that the "master mind" should be on the job, and there is no better way to be sure it will be on the job than to hold up the work until it is.

Seeing That Standards Are Maintained

Writing a standard practice for large, difficult castings is not enough, even though the standard covers every detail connected with the work. The man has already been told how to do his work; the next important item is to see that he does it that way. And the only way to be sure he does it as instructed is to inspect his work at all important stages of progress.

The old plan is to offer general instructions on how to make a mold and, if the casting does not come out well, to call the molder who made it into the cleaning department and tell him about it, and caution him to avoid the same mistake the next time. This is probably a cure, but what we must have is a preventive. In the production of large, intricate castings we cannot afford to wait until the casting is bad, to tell the molder how to make a good one. If a molder make his mold right his casting will be good, and it is more important to see that his mold is made right than to give him a lecture about a bad one.

The scheme is to have the planning department carefully study each casting to be made, and consult with the superintendent about the critical points that must be looked after to insure a good mold. This information will enable the department to write a period inspection card which can be sent out with the job order. This period inspection card will specify the various times the superintendent wants to see the work in progress. The card can be a standard card with inspection periods numbered as follows, or to suit local conditions:

Period No. 1—When drawing is received in pattern shop. Molding methods, and character of pattern to be made.

Period No. 2—When pattern or sweep is in place ready to begin work. Inspect method of gating, and plan of partings and vents.

Period No. 3—When mold is ready for oven. Inspect for finish, vents and perfect joints.

Period No. 4—When mold is taken from oven for assembling; inspect cores at this time.

Period No. 5—When all cores are placed.

Period No. 6—When all cores are placed, and mold is ready for the first loam section to be put in place.

Period No. 7—When the first section of cope for loam mold has been tried on and is ready for final closing.

Period No. 8—When second section of cope for loam mold has been tried on and is ready for final closing.

Period No. 9—When all cores are set that can be placed before setting the main core and upper port core; main core must be ready for placing at this time.

Period No. 10—When cope has been tried on and ready for final closing.

Period No. 11—When mold has been clamped and runners made, and work is ready for pouring.

Period No. 12—When green sand mold is ready for cores and with all gates cut.

Only the inspection period desired on a given job is marked, opposite the period number.

Inspecting a Marine Cylinder Mold

A good example of how this plan worked in practice is described in the production of a marine cylinder. The inspection periods marked on this card were numbers 2, 3, 4, 9, 10 and 11. The first inspection was No. 2, when the pattern was placed in the flask and all loose pieces assembled ready to begin ramming. At this time we carefully considered the method of gating, and the points for the various partings, also where we were going to carry off the vents.

We decided on a ring of pop gates around the upper end of the cylinder barrel, allowing the metal to drop to the bottom of the mold. This plan kept the hot metal on top while the mold was being filled. The agitation created in the rising metal by the pop gates caused any dirt which might accumulate to rise to the surface with the metal. This plan of gating produced a casting free from cold shuts and dirt. The partings were made only where it was necessary, to get the cores in the mold. The mold was well vented by using cinders and ramming vent rods extending through the vent holes in the flask, and pulling them out, thus creating a positive vent that would help dry the mold and carry off the gas promptly. This resulted in the metal lying quietly in the mold, thus preventing any soggy places in the casting.

The next inspection was No. 3, when the mold was ready for the oven. This inspection showed a very nice finish, with the exception of a very few places which were remedied before the inspection card was signed.

Cores Inspected with Mold

Inspection No. 4 was made when the mold was taken out of the oven for assembling. At this time the cores were inspected, and with few exceptions were used as made; several not thoroughly dry were re-dried.

Inspection No. 9 was made when all cores were placed except the upper port core and the main core. At this time we were able to check the metal thickness between the various cores, and inspect the general appearance of the mold and see if it was free from dirt. The vent connections leading from the cores through the mold to the outside were checked; the main core, also, was inspected and found to be O. K.

Steel Plates to Resist Lifting

The next inspection was No. 10, when the cope had been tried on and was ready for final closing. At this time everything was found in good shape except the method of holding down the large cores that extend through the supports of the cylinder. Instead of using merely soft

clay for holding these cores in place, this method was changed to steel plates in conjunction with soft clay. The soft clay is used to seal the joints and the steel plates to withstand the lifting pressure exerted against the core when the mold is poured. Had these cores moved while the mold was being poured, the metal would have found its way into the vents and a bad casting would have been the result. So inspection No. 10 was really what saved our casting.

The last inspection was No. 11, when the mold had been clamped, the runners made, and everything was ready for pouring. The work at this time was satisfactory and the mold was poured. Result: A good casting, free from shrink holes, blow holes, dirt and soggy places, and one that stood a hydraulic test of 280 lb. to the square inch.

Not Much Time Consumed

As the above inspection covered a period of three weeks, it can readily be seen that, without a previously planned arrangement of inspections, some of the most important ones would have been neglected. None of the inspections on this job required more than a few moments of the superintendent's time, but his experience and knowledge were applied to every important part of the work.

With a plan of this kind every important job in a large foundry can be handled personally by the superintendent. And by handling the work in this manner he will have more time, to develop new ideas and good things, than if he superintends the work in a general or haphazard manner.

Definite Urge to Have Things Right

It is surprising how few cases are found when inspection shows corrections or changes are needed. This is partly true because the foreman knows his work will be inspected, and he makes a greater effort to have it right for the inspection period. Consequently, although no corrections are necessary, the inspection periods have an

influence for good. The fact that the superintendent insists upon inspecting the work in this manner is not, however, a reflection on the foreman's ability. But very often the superintendent is looking at the work from an entirely different angle from his foreman, and in so doing sees things that otherwise have been overlooked.

The time consumed inspecting each job at certain intervals is much less than one would think, and interferes very little with the regular routine work, because in a large measure it takes care of the routine work.

Occasionally a call for inspection will come at a time when it is not convenient for the superintendent to visit the part of the shop where the work is located. But the inspection must be made and other things must wait, because there is nothing so important as a good casting in the foundry, at least, in a casting which is considered important enough to have the inspection period specified.

In absence of the superintendent it is the duty of the man in charge of the planning department to call upon the general foreman, and accompany him to the mold, and have him inspect the work and sign the inspection card. After the job is completed the card is collected by the planning department and filed for future reference.

Superintendent Kept Closely Informed

The period inspection plan automatically puts the superintendent to work; it keeps him in close touch with how the work is being done; it keeps the foreman on the job, because he knows that his mold or core is going to be inspected; it keeps the molder or coremaker from slighting his work, because he knows a half-made job will not bear inspection.

While it is important to tell men how to do their work, we believe it is more important to know that they do it according to instructions. And to know this before the mold is poured, and the only way to be sure the work is done according to instructions, some plan is necessary, similar to the one described, that compels those in charge to check personally the work in progress.

Large Savings Effected Through Foundry Sand Control

PROGRESS in foundry sand control was one of the topics at the session devoted to the foundry during the Western Metal Congress, which the American Society for Steel Treating held at Los Angeles the week of Jan. 14. A. A. Grubb, foundry consultant, Mansfield, Ohio, delivered a paper entitled "Foundry Sand Control," in which he reviewed the present status of that important development. An abstract follows:

The American Foundrymen's Association, through its committee on molding sand research, has been very active the past several years in studying sand control and conservation. Tests have been developed for measuring the important properties, a survey of sand resources of the country has been made, a system of grading sands has been adopted and sand conservation and reclamation methods have been studied.

Much foundry trouble and casting loss are caused by improper temper or moisture content of sand, by lack of uniformity in new sand shipments and by changes in sand properties which are discovered only after the castings have been poured and found defective. Sand control involves discovering, by experience and by experiment, the sand properties best suited for the work at hand, then maintaining these properties by repeated tests, proper additions of new sand and water and thorough mixing. Bond strength and permeability tests can be quickly and easily made and are effective for frequent control tests. Grain

fineness and clay determinations are highly valuable for controlling shipments of new sand and bonding clays.

Wide Variation in Clays

Clays differ widely in quality. Some consist largely of grains but little smaller than those caught by the finest sieve, while others are composed largely of particles a hundred-thousandth of an inch or less in diameter. These latter clays are said to be highly colloidal. When they are dried they become almost as hard as Portland cement.

A system of grading sands according to their grain fineness, clay content and grain shape has been developed and adopted. Further classification based on quality of clay content is under consideration. It is hoped that such a grading system will help foundrymen to obtain more uniform sand shipments.

Money Saved by Reclaiming Burned Sand

Progressive foundries are giving much attention to the reclamation of burned sand that was formerly discarded. Such reclamation involves careful selection of materials and rigorous control of the sand properties. A number of foundries that practice sand control and reclamation report lower casting losses and marked economy in sand consumption. Savings of from \$40,000 to \$100,000 a year are claimed by individual steel foundries.

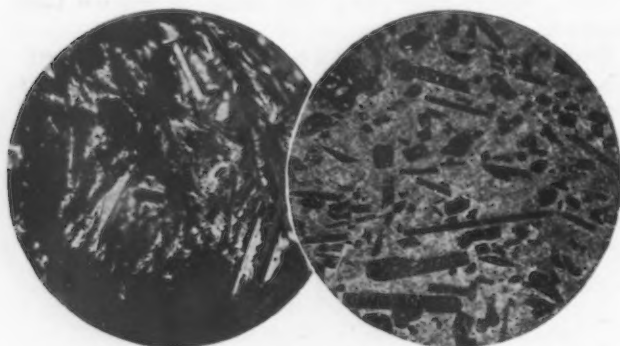
What Is Dross in Galvanizing Pots?

Analysis of Formation of Trouble-Making Element —What Causes It and How It May Be Limited

BY WALLACE G. IMHOFF*

WHAT is dross? Where does it come from? Those two questions confront every practical galvanizer. The amount of dross made in various galvanizing plants ranges from 8 to 50 per cent; the average dross production is perhaps 12 to 20 per cent.

To reduce dross production two things must be known: first, what dross really is; and second, where it comes from. Dross is a zinc-iron alloy the composition of which varies with temperature and quantities of zinc and iron present. Strictly speaking, in more technical language, dross is a saturated solution of zinc with iron, with zinc-iron alloy crystals in it. To illustrate just what dross is, attention is called to Fig. 1. This photograph shows a



Figs. 1 and 2—Ordinary Plant Dross. Both views show the long, slender needles of zinc-iron alloy

piece of ordinary plant dross, just the way it is taken from the pot. The long, slender, crystalline forms of the zinc-iron alloy can be seen plainly.

All practical galvanizers know that dross is made up of two things, these crystals, and the zinc left in the dross after cutting and slicing. These long, slender needles of zinc-iron alloy seem to crystallize in the rhombohedral division of the hexagonal system. It is well known that the metal zinc has a crystal lattice type of hexagonal, close-packed, and, since these crystals are largely composed of zinc, this may influence the crystal form of the alloy.

"Dry dross" contains a minimum amount of metallic zinc, and a large amount of zinc-iron alloy crystals. "Wet dross" contains a large amount of metallic zinc, and fewer zinc-iron alloy crystals. It is also well known to the practical galvanizer that dross must be made up of all the crystals he could get out, and all the zinc left in, that he could not get out by cutting and slicing the dross. But he has never really seen it, although he knows that is what it is.

Fig. 2 shows some ordinary plant dross as seen under the microscope. Here the facts are fully verified. The

long black needles of zinc-iron alloy, in the white area of saturated zinc with iron, can be plainly seen. Some of the crystals are long, others seem to be shorter, and still others seem to be almost square. This is due to the crystals being cut in preparing the specimen. The long crystals are parallel to the surface of cutting, while the square ones were vertical and were therefore cut directly in two. The others are tilted and cut at various angles between.

This dross analyzed 3.26 per cent iron. Fig. 2 shows plainly the character of dross. Cutting and slicing the dross allows the metal between the zinc-iron alloy crystals to be drained off. The bath must, of course, become saturated with iron before the crystals will separate out.

It is now clearly seen that dross is made up of long, slender zinc-iron alloy crystals in a zinc bath saturated with iron. Zinc will actually dissolve the iron to form first a saturated solution of zinc with iron, and then the addition of more iron causes the separation out of the zinc-iron alloy crystals. Having a higher specific gravity, the dross settles to the bottom of the pot. The saturation point is reached when more than 0.1 per cent of iron is dissolved, although the temperature plays a most im-

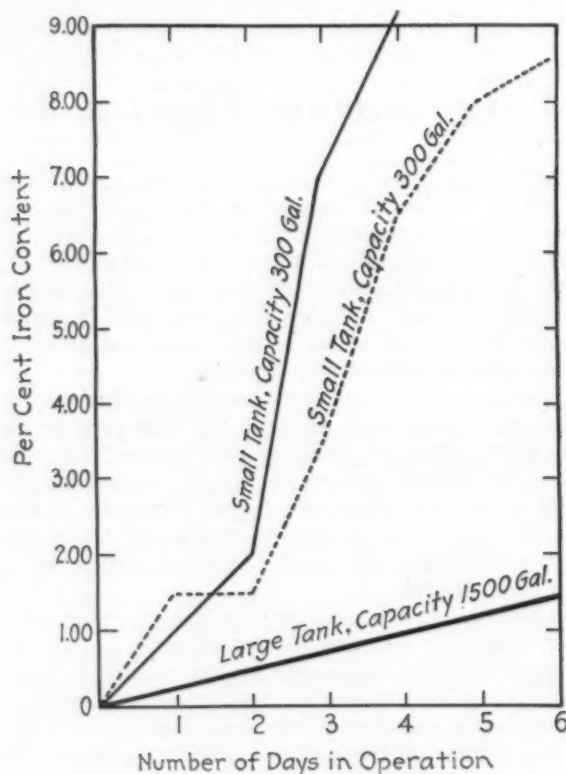
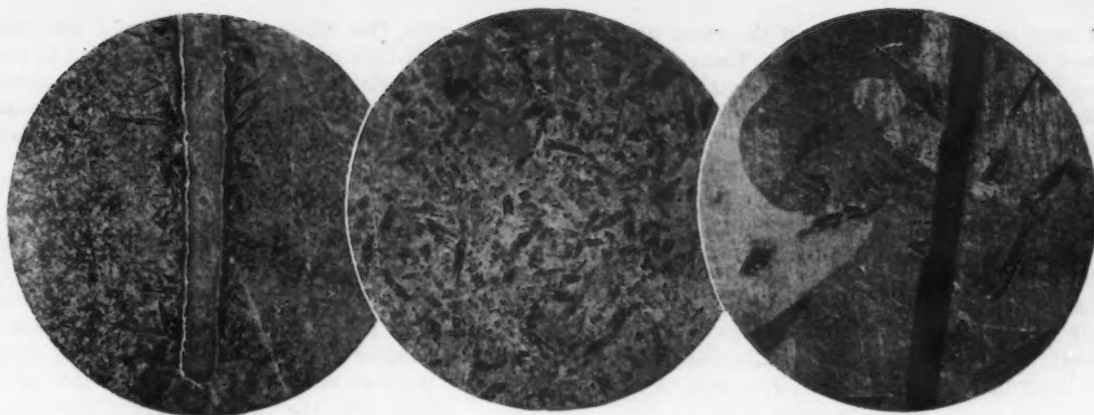


Fig. 3—Increase in Iron Content in Small Pickle Tanks Is Much Faster Than in Large Tanks. And high iron means high dross production, while low iron results in low dross production

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Figs. 5, 6 and 7
(Left to Right)—
Show Respectively
Dross from the
Steel Base; Dross
Formed from
 Fe_2O_3 at 1000
Deg. Fahr. and at
1100 Deg. Fahr.



portant part. The higher the temperature, the more iron the zinc will hold in solution.

The chemical composition of the dross is affected by many factors, the most important of which are the bath temperature and the method of drossing the pot. Some drosses are dry and sandy—high-temperature dross; others are wet and metallic—low-temperature dross. The chemical analyses of some drosses has shown an average composition of about 96 per cent zinc, 3.80 per cent iron and 0.20 per cent lead. No doubt a very careful chemical analysis would reveal small traces of tin, aluminum and cadmium, as these metals are generally found in most galvanizing baths. A few typical analyses of plant dross are given below:

	Per Cent Zinc	Per Cent Iron	Per Cent Lead
1	96.61	3.39	...
2	97.54	2.46	...
3	95.82	3.99	0.19
4	96.28	3.51	0.21
5	94.71	5.43	...
6	94.13	5.93	...

No. 2 is "wet dross"; the iron is low. No. 6 is "dry dross"; the iron is high. As the temperature increases the color of the dross changes, first to a golden yellow and at a high temperature to a deep blue. Low-temper-

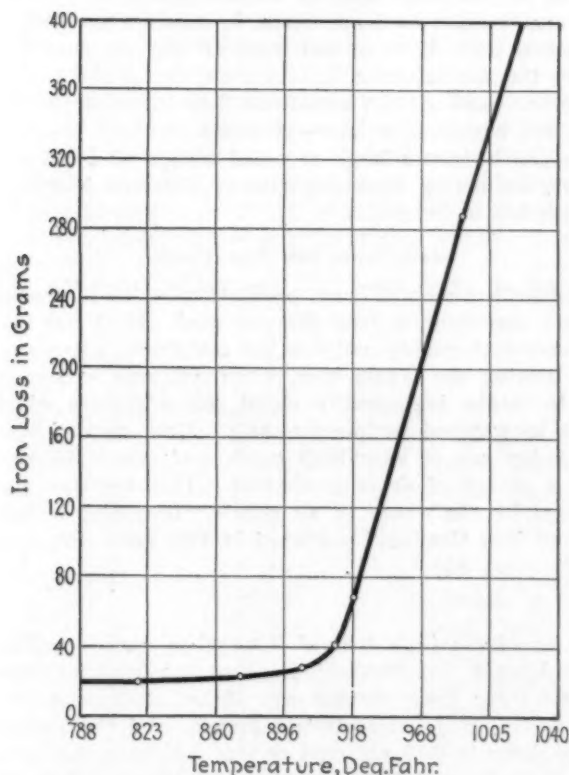


Fig. 4—Progress in Corrosion of Galvanizing Kettles as Temperature Increases. A sudden change comes after about 900 deg.

ature, wet dross has a white, or slightly bluish white, metallic appearance. The higher the temperature the more the tendency toward dry, sandy characteristics.

This answers pretty well what dross is. The next question is, "Where does dross come from?" There are many sources of dross, but as is found in all things some are far more important than others. The most important sources of dross are listed below:

1. From the zinc used.
2. From iron oxides; corrosion.
3. From overheating the zinc.
4. From the pickling operations.
5. From material dropped into the pot.
6. From the steel base itself; production.

It is impossible at this time to take up and discuss fully each one of these causes. In the first place, the importance of each one varies according to whether the condition is aggravated, or just normal. In the second place, the importance of the conditions vary from plant to plant, according to local conditions, plant design, equipment, methods of operation, production required, etc. If it were possible to give them an order of importance under normal conditions they probably would be arranged as follows:

1. From the pickling solutions.
2. From overheating the zinc.
3. From the steel base itself; production.
4. From iron oxides; corrosion.
5. From material dropped into the pot.
6. From the zinc used.

Each one of these features will now be briefly discussed in the order of their importance.

Dross from Pickling Solutions

By far the largest source of dross is from the pickling solutions. No definite figures can be given, since practice varies over wide ranges, but a rough estimate would be that from 50 to 70 per cent of the dross produced is directly caused by the pickling solutions. A practical analysis of the situation shows that all the scale and iron dissolved from the steel surface, whether sheets, angles, plates, girders, bolts, castings or what not, can go into only one place, and that is the pickling solution.

Iron does not evaporate; the water in the pickling solution may be dried off, but the iron from the pickling solution is still there. From the pickling tanks the material goes to the muriatic tank and from there into the pot. But it has been shown that dross is an alloy of zinc and iron. It will now be shown that all iron, easily available, makes dross. For example, analyses made of some muriatic acid solutions showed the following compositions:

Tank No.	Acid, Per Cent	Iron, Per Cent
2	5.25	11.00
4	6.00	14.00
5	3.00	10.00

Iron is there, plenty of it, to make dross. Too much emphasis cannot at this time be placed on the chemical analyses of pickling solutions. They should be analyzed

at least once every day, about the same time, and a close check kept on the iron content. There are now tablets on the market for making quick tests right at the tanks, whenever it is thought necessary. The importance of the pickle tank capacity is brought out by making these practical tests of the pickling solutions for acid and iron content. The curves shown in Fig. 3 illustrate the iron content of small pickling tanks and large pickling tanks after a week's operation. It is seen at once that the small tanks (300 gal.) become almost saturated (9 per cent) with iron in about four days, while the large tanks (1500 gal.) show only 1½ per cent iron content at the end of a week's operation. In most plants the pickling solutions are by far the most important source of iron to form dross.

Dross Caused by Overheating

The second source of iron for dross is overheating the metal. It usually takes from two to three weeks for new

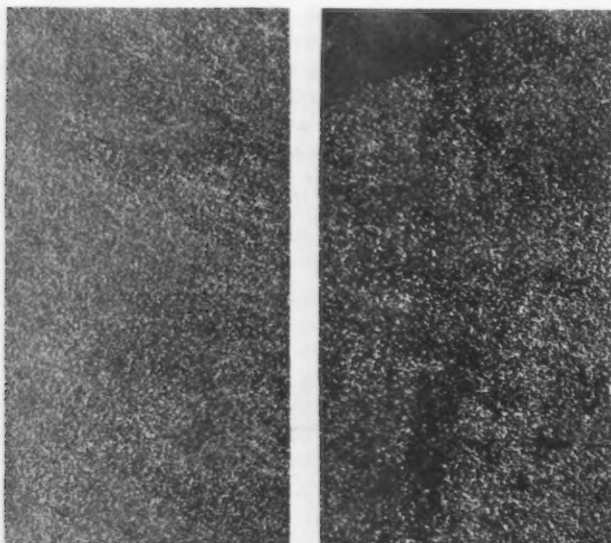


Fig. 8—Galvanized Coating Turned to Dross by Long Submersion. At left, at 790 deg. Fahr.; at right, at 910 deg. Fahr.; both were 28-gage sheets submerged 4 min.

zinc to become saturated with iron, and with good pickling practice this may be extended to almost six weeks. In one instance a pot was overheated only 4 hours, yet almost 2 tons of dross was immediately produced, with new zinc.

The question is, then, "What is the dangerous temperature that makes dross form rapidly?" Fig. 4 is a graph of the dissolving power of molten zinc at and above galvanizing temperatures for iron. It will be noticed that from 788 deg. Fahr. to 860 deg. the action of molten zinc upon iron is very slight; from 860 deg. to about 900 deg., however, the dissolving action becomes accelerated; while above 900 deg. the action becomes very violent. It destroys the pot and produces excessive dross formation. The design of the galvanizing furnace and the proper combustion of the fuel, therefore, become of first importance.

Dross Coming from the Steel Base

The third source of dross is from the steel base itself, production. Therefore surface area becomes an important factor. Fig. 4 illustrates well the dissolving action of molten zinc upon iron. Fig. 5 shows the formation of dross crystals from the iron furnace. The metal bath around the plate is seen to be full of these dross crystals. Therefore, according to the temperature of the zinc bath, the iron is going to be dissolved from the surface at a rate which is shown in Fig. 4 for the various temperatures. Another feature of importance, in addition to the temperature, is the wash-action of the metal on the surface. The greater the washing-action on the surface, the larger the amount of iron dissolved.

This discussion brings out the important relation of surface area to weight as applied to practical galvanizing. Sheets, small materials such as screws, small forgings, small castings, etc., all have large surface area; hence make more dross. Large material has more weight, less surface area, hence less dross.

Dross Caused by Corrosive Action

Our fourth source of dross is from iron oxides, from corrosion of the material going to the galvanizing pot. To prove this fact definitely some iron oxide was mixed into pure molten zinc (very high-grade spelter). After heating to 1000 deg. Fahr. the dross crystals started to form as shown in Fig. 6. By raising the temperature to 1100 deg. the zinc assumed a clear, crystalline form and the dross separated out as large crystals in the usual form, as shown in Fig. 7.

It was therefore proved conclusively that iron oxide (Fe_2O_3) corrosion on the surface of the steel base will produce dross when these articles go into the kettle to be galvanized. A further proof of the fact is shown when the used sal-ammoniac flux is analyzed, because very little iron is ever found in it. These factors emphasize still more the importance of the pickling department, which up to the present time has received little technical attention.

Dross from Material Dropped Into the Pot

The fifth source of dross is from the material dropped into the pot. With large articles such as boilers, sheets, etc., there is practically no dross formed from this force, because none of them gets lost. With medium sized articles, however, every now and then a piece drops off the rack and goes down to the bottom of the kettle. A good galvanizer will "fish" it out at once. He knows from practical experience what will happen.

Fig. 8 illustrates vividly the results. The coating quickly turns to dross, as is seen on these two 28-gage sheets after 4 min. submersion in the molten zinc. The coating is destroyed, and dross is quickly produced.

The largest source of dross from material lost in the pot is from small work done in baskets. To obtain a good coating the material must be worked with a rod, turned over, and washed back and forth, to insure a good alloying action with the zinc, and wash off the adhering flux. Poking the articles often knocks them out of the basket. Still other small articles sometimes float out of the basket when the basket is submerged under the bath surface. These articles are a large or small source of dross production, depending upon the number lost, and how long they are left in the pot.

Dross from the Zinc Used

The sixth source of dross production, which is usually not very important, is from the zinc used. Most slab zinc is of very high quality and does not contain high iron content. During the World War, when zinc was extremely hard to obtain, high-quality metal was a feature which had to be watched for more closely. Most metals, however, today are of very high grade and cannot be said to be a source of dross production. This question was discussed by the writer in an article, "Obtaining a Satisfactory Zinc Coating," published in *THE IRON AGE*, Oct. 4, 1928, page 811.

To avoid the high cost of low-carbon ferrochromium Edgar Allen & Co., Sheffield, England, manufacture some stainless irons from chrome ore. After steel scrap has been melted in a basic electric furnace and the carbon worked down to 0.10 per cent or less, a mixture of powdered chromite and ferrosilicon or aluminum is charged. The chromium is thereupon reduced from the oxide and enters the bath. Difficulties with excessive slag and "off-heats" have prevented wider adoption of this method.

Why Ingot Molds Have Short Life

Large Flakes of Graphite Detrimental—Change in Composition and Surface Hardness Advocated—Interesting Study of Changes on Inner Surface

BY JOHN H. HRUSKA*

FOLLOWING the general tendency to seek economy in modern steel works, many operating executives have been interested in any suggestions involving an increase in the life of ingot molds. Real improvements, however, have not materialized, for apparently no actual pertinent data, obtained from observations in the mold foundry during pouring and finally in the scrap yard, have been compiled or judiciously investigated. Hence, there still remains the sad fact in the daily reports to the mill management that usually the life of ingot molds seldom exceeds 100 heats and that very often the number of heats per mold averages even below 40 or 50.

Furthermore, ingots cast into molds that have seen 60 to 80 per cent of their usual period of usefulness disclose a steadily increasing inferiority on the interior surfaces, followed by difficulties in stripping, blooming and rolling in general. These factors, while not directly revealed in the efficiency figures of the ingot producing department, are of value if the economy of the mill as a whole is being considered.

Accordingly, in most ingot steel plants, a questionable analysis is usually assigned as the main reason for scrapping ingot molds. This explanation is, in most cases, based more on personal opinion than critical judgment. Other reasons are firecracking and rough or burnt surfaces, but these phenomena are mostly of a secondary nature. Careful studies of the various characteristics of walls of scrapped molds reveal interesting facts which, if properly interpreted, would undoubtedly point out the directions along which, thermally and mechanically, a more efficient handling of molds, and consequently further improvements in the life of molds, would be possible. The author has examined a considerable number of scrapped

molds and one of his investigations is described in this article.

Characteristics of the Mold

THE mold selected for a study of the chemical and structural changes of ingot mold iron during its service was one of the commonly used types, and the metal teemed into it was made exclusively in basic open-hearth furnaces, being in all cases of the lower carbon type. A relatively high-silicon and high-manganese direct metal—seasoned for about 2 hr. in the ladle—was used for the manufacture of the mold. The mold's dimensions were as follows:

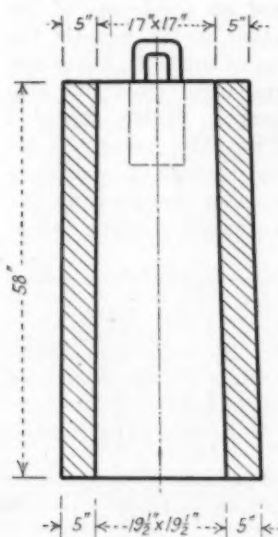
Interior, top	17	x	17	in.
Interior, bottom.....	19½	x	19½	in.
Height of mold.....	58	in.		
Thickness of wall.....	5	in.		

The average chemical analysis of the mold iron was determined from drillings taken across the whole section of the wall. It gave the following results:

Total carbon.....	3.54	per cent
Manganese	1.26	per cent
Phosphorus	0.104	per cent
Silicon	1.43	per cent

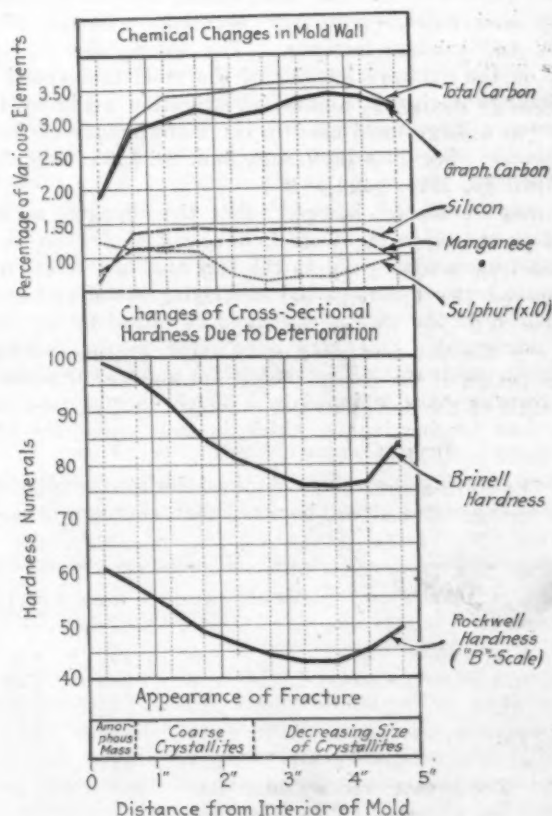
Hardness tests, made by means of a portable Brinell hardness tester on the face of the mold, averaged 108

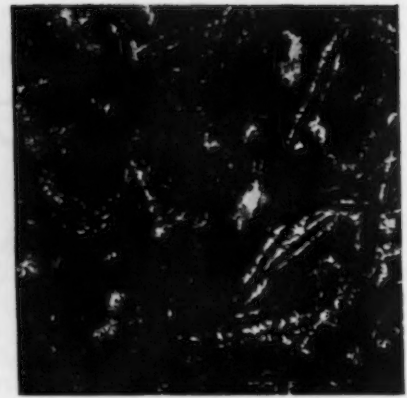
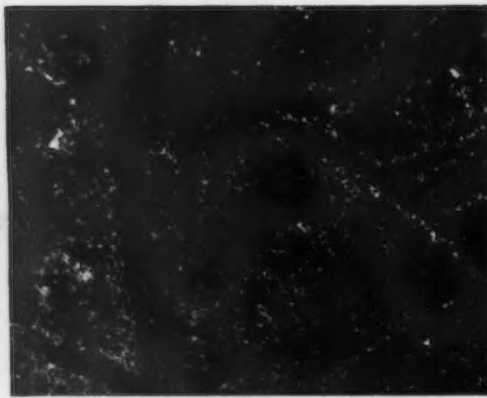
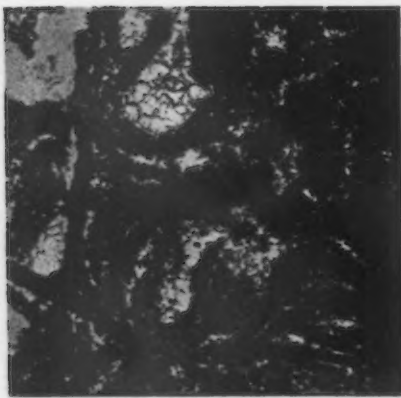
*Metallurgical engineer, 2328 South Euclid Avenue, Berwyn, Ill.



Dimensions of the Ingot Mold Which Was Examined (at Left)

Results of the Chemical and Physical Tests of the Deteriorated Mold Wall Expressed Graphically and Contained in Table I





Microstructure of Various Layers of Deteriorated Ingot Mold. Fig. 1 (left) represents interior surface of wall; Fig. 2 (middle) center of ingot mold wall; Fig. 3 (right), outer surface of ingot mold wall

Brinell numerals with a gradient of 9 numerals. A careful examination of the interior of the mold did not reveal any defects visible to the naked eye.

After finishing this preliminary investigation, 118 heats with an average carbon content of 0.21 per cent were teemed into this mold before it was scrapped, due to "burnt interior surface." As observed on most ingot molds of this type, the maximum of deterioration was at about 80 per cent from the bottom of the mold.

Examination of the Mold Wall

TO determine the chemical, physical and microscopical changes in the mold iron, the wall of the mold was cut transversely in the center of each of the four sides, about three-quarters of the way from the bottom of the mold. From plates representing the thickness of the wall, drillings were first taken on 10 locations, and then these plates were tested at five locations for Brinell and Rockwell hardness ("B"-scale) in 10 distances from the interior of the mold. The average results of these tests are compiled in Table I and graphically expressed in one of the diagrams.

The chemical analyses reveal the expected fact, that practically all chemical constituents are oxidized near the interior portion of the wall and, hence, that carbon, manganese and silicon relatively decrease, whereas phosphorus and sulphur increase. The values observed directly on the oxidized interior of the mold correspond to the findings during a similar investigation made by the author on a large mold used in the manufacture of forging ingots. (See *THE IRON AGE*, Jan. 29, 1925, page 341, and April 15, 1925, page 1049.)

It may be stated, however, that the changes, as observed on the large ingot mold, were not so drastic as in this case, due undoubtedly to the fact that the total time of contact between molten and solidifying metal and mold was shorter in the case of the mold described in the previous paragraph. One may only refer to the common practice in steel works, that ingots for rolling purposes—after teeming—are stripped in a much shorter time interval than forging ingots, which, in most cases, are left in the mold until black.

When studying the values obtained during the physical testing of the plates, it will be noted that, contrary to most

assumptions, the center of the mold wall is considerably softer than the outer layers and, furthermore, that the layers corresponding to the interior of the mold become harder than the outside of the mold. An explanation of this phenomenon will be found in the micrographical study of the specimens representing the investigated mold wall.

The changes in microstructure have been studied on specimens cut longitudinally and transversely from each plate. Photomicrographs representing the inner part, center and outside layers of the described mold wall are

Microstructure of Deteriorated Interior of the Ingot Mold



shown in Figs. 1, 2 and 3. The corresponding specimens were polished, and then etched with 5 per cent nitric acid. All photographs were taken at a standard magnification of 50 diameters.

A careful consideration of all chemical and metallographical characteristics observed on specimens of the mold mentioned, as well as on other molds, reveals the indisputable dependence of the size of graphite flakes not only on the chemistry of mold and ingot steel, but also on the relative temperature intervals during repeated heating and cooling. Thus, larger graphite flakes will develop in pearlitic cast iron with an increase of maximum temperature intervals, whereas smaller temperature intervals will decrease the size of the flakes. Larger flakes,

Table I—Average Results of Analyses of the Wall of the Ingot Mold

Location	1	2	3	4	5	6	7	8	9	10
Distance from Inside of Wall (in.)	0.25	0.75	1.25	1.75	2.25	2.75	3.25	3.75	4.25	4.75
Total carbon, per cent.....	1.86	3.06	3.40	3.42	3.47	3.58	3.60	3.62	3.49	3.24
Graphitic carbon, per cent....	1.84	2.88	3.04	3.19	3.10	3.16	3.35	3.41	3.36	3.16
Silicon, per cent.....	0.61	1.36	1.41	1.43	1.40	1.40	1.38	1.36	1.38	1.18
Manganese, per cent.....	0.80	1.13	1.14	1.21	1.24	1.28	1.18	1.20	1.21	0.92
Phosphorus, per cent.....			0.118						...	0.097
Sulphur, per cent.....	0.124	0.112	0.110	0.108	0.074	0.064	0.069	0.067	...	0.097
Brinell hardness, aver.....	99.0	96.0	92.0	85.0	81.0	79.0	76.0	76.0	77.0	84.0
Rockwell "B" hardness, aver..	60.8	57.3	52.8	48.5	46.8	44.3	42.8	42.8	45.5	49.3

however, offer a decreased resistance toward intercellular cracks, thermal fatigue and oxidation of the mold metal, thus decreasing, in general, the number of heats per mold.

Summary

THIS investigation has revealed the chemical, physical and microscopical changes occurring in ingot mold walls during the life of the mold. The rather theoretical conclusions of this work point out the importance of the size of graphite flakes as affected by the chemical composition of ingot molds. As a result, the tendency of the

mold foundry and ingot producing department should be toward a decrease in the size of graphite flakes, which points primarily either to an addition of chromium to mold metal or to some other changes in chemical composition or the thermal treatment of ingot molds.

Furthermore, the investigation, together with other observations, points to the beneficial influence of an increase of the surface hardness of molds which, in turn, depends upon chemical and thermal conditions in the manufacture, as well as thermochemical factors involved during the service, of ingot molds.

Welding of Power Plant Piping

Outline of Precautions to Be Taken If Satisfactory Results Are to Be Obtained—Properly Made Weld Held as Strong as the Pipe

BY F. G. OUTCALT*

DEVELOPMENTS during recent years have reached the point where it is possible for the power plant engineer to treat welded construction exactly as he does other types, if he takes the necessary steps to secure high-quality results. He must consider the following points: 1—Specifications of material and design; 2—Selection of competent organization to do the work; 3—Provision for inspections to see that specifications have been carried out.

The National Tube Co. recently has conducted tests to determine the strength of oxy-acetylene welded joints in full-size pipe specimens. In these tests specimens of 4-in., 8-in., 12-in. and 16-in. pipe were subjected to tensile tests in a 600-ton hydraulic machine capable of gripping the full-size specimens and pulling them to destruction. The test also covered four different types of welds. From this investigation the following conclusions were drawn:

1. A properly made joint is as strong as the pipe.
2. The simple butt-welded joint is the most efficient and is recommended for use in welding pipe.
3. High strength and nearly equally satisfactory results were obtained with the normal socket and socket with groove joints. In joint design, however, other factors were considered, as cost of preparation, distribution of the strain and the ease of welding, which makes these designs less satisfactory than the butt joint. The weakest joint was the socket with welded rivets.
4. Due regard must be given to penetration and to the shape of the joint, particularly the reinforcement of the weld. This is more important in the larger than in the smaller pipe sizes. Butt welds should be reinforced at least 25 per cent and should be built up so as to present a gradual increase in the reinforcement from the pipe wall to the center of the weld. Fillet welds, when used, should be built up well in excess of the wall thickness of the ball.
5. There is no detrimental heat effect or structural weakening of pipe metal, caused by welding.
6. With qualified welders under procedure control methods a pipe joint of maximum efficiency can be consistently and uniformly made.

The single-vee butt joint is the most economical and satisfactory type for straight pipe-line construction. However, where the pipe joint is to be subjected to considerable bending, as on expansion loops, it is considered good prac-

tice to place the collar over the butt joint and have the collar fillet welded to the pipe.

For a single-vee butt weld, the ends of the pipe should be beveled to 45 deg., with a shoulder usually 1/16-in. at the bottom to facilitate alinement and penetration. Specifications should call for 100 per cent penetration to root of weld, and state the reinforcement required. When high-test welding rod is used, the average reinforcement is 20 per cent, with a stated minimum of 12½ per cent. For design purposes, the ultimate tensile strength of a butt weld made with high-test rod is taken as the strength of the material, up to 50,000 lb. to the square inch. This is used with the same factor of safety that is applied to the pipe itself. It is essential that the weld taper gradually toward the toe.

The most satisfactory flange design for welding is one in which the hub is moored or cast integral with the flange, and of sufficient strength so that it may be butt welded to the pipe nozzle or pipe end for connection to flange valves.

Three designs may be employed for outlets and take-offs from the straight line piping system. These are the straight type nozzle, the flared type nozzle and the saddle type nozzle. The straight type nozzle is recommended for pressures which produce a line stress of less than 5000 lb. to the square inch. With this type the weld is made at the point of maximum stress and, furthermore, a straight angle joint results, which may not be entirely satisfactory from the standpoint of efficiency of flow.

The flared type nozzle gives a rounded contour at the take-off and also removes the weld from the point of maximum stress. This, however, is more expensive than the straight type nozzle and may not be practical to produce in all sizes of pipe.

The saddle type nozzle is butt welded into an opening in the header. Where the diameter of the nozzle permits, the welder may also reach in and weld from the inside.

The straight type nozzle is almost universally used for low-pressure take-off and the latter two designs are receiving considerable attention, especially for high-pressure header construction.

Swiss Federal Railways have tried various designs of poles for electric transmission lines, with a view toward economy, permanence and aesthetic values. An all-welded pole with smooth exterior surface has been adopted. No projections, where water can collect, are allowed. Cleaning and repainting can also be done at minimum expense.

*Development engineer Linde Air Products Co., New York. Abstract of paper before the Mid-West Power Engineering Conference, Chicago.



BOOK REVIEWS



Recognizing the Human Factor in Industry

Human Engineering and Industrial Economy. By Lawrence A. Hartley. Pages, 344, 5½ x 8 in.; illustrated. Published by Marshall-Jackson Co., Chicago. Price, \$3.

During the last decade American industry has made remarkable progress. Foremost among the contributory factors to this progress have been purely technological development and the rise of what we have chosen to call human engineering. The purpose of Mr. Hartley's book is to interpret the part played by human engineering in achieving industrial economy and also to point out the great potentialities that are yet to be realized from this comparatively youthful economic ally. As director of education for the National Founders' Association, the author has stood for a long time on the common ground of the employer and employee, and in this book he views the problems of both without prejudice.

The early chapters are devoted to the importance of open-mindedness in the progress of industry. Although seemingly an old story, it is certainly true that a full recognition of the value of satisfactory human relationships in business requires more vision than the adoption of technical advances that offer a readily accessible monetary profit. But the subsequent chapters of Mr. Hartley's book offer conclusive proof that those companies which were the first to recognize the value of conducting their businesses with due regard to the rights and problems of their employees have been far more successful than those which failed to realize those potentialities. In the old days the concern of management with the affairs of the employee was known as paternalism and was a luxury possible only to the larger and more wealthy companies. Now, it is pointed out, this concern has become mutual economic interest and as such is recognized by both employer and employee. "The line between paternalism and mutual economic interest," says the author, "is the exact point where the interest shared by employees and managers is actuated by industrial economy." This is the reason that the far-sighted industrial concern is interested today in "making men while making money."

Yet even though a generous portion of Mr. Hartley's book is given over to discussion of the broader phases of human engineering and its relation to industrial efficiency, it does not neglect the more specific methods by which the individual problems are approached. The chapter on time studies is particularly interesting, showing as it does their relation to the stabilization of employment. In the following paragraph it says:

Any company which neglects time studies of some accurate nature is certainly treading upon dangerous ground. Most emphatically also a company which wholly neglects time studies is not a safe company to work for. Time studies are fundamental to cost control and cost control is in turn fundamental to stabilized employment which is accepted by all thoughtful industrialists as essential to effective and permanent industrial relationships.

Another chapter that deserves the attention of even the most efficient management is that devoted to the recording of costs. The common errors in recording costs are thoroughly treated, and the influence that a mistake might have on stability of employment and general industrial economy is pointed out. Thus if a selling price, incorrectly determined by the cost department, happens to be too high, a competitor with correct cost figures may nat-

urally make a lower bid for the business, and, if the order is large enough, the first plant must be slowed down, with consequent laying off of men. If the cost has been figured too low salesmen merely turn in an abundance of orders, which help to send the company into financial difficulty. Other interesting sections of the book are devoted to the relation of safety programs to industrial economy, company loans to employees, industrial education, economical production as related to selling and the economic value of industrial friendship.

Throughout the book emphasis has been placed on the ultimate mutual obligation of industry to produce economically. Certain fundamental problems make themselves felt everywhere in industry and upon their solution rests the future progress of mankind. No one of these problems is more important than true recognition of spiritual values in industry. This recognition has already led to improved tastes and higher standards of living, with consequent diversification and vast increase in production. Upon putting down this book, the reader may, with some stretch of the imagination, bear with the author in visualizing a "new industrial day, when we shall see the coming of that superpower of human fellowship which will transform our factories into wonder shops of happiness where the atmosphere of agreeableness is ever present and where we shall work together for joy in the production of the fundamentals of life." Certainly in 1900 no one could have imagined that a company in Dayton, Ohio, employing thousands of men in the manufacture of electric refrigerators, would be using its employment department to find jobs in other plants for satisfactory workmen whom it had been forced to lay off temporarily on account of slackened production.

Applying Motors to Industrial Machinery

Electric Drive Practice. By Gordon Fox. Pages, 492, 5½ x 8 in., illustrated. Published by McGraw-Hill Book Co., New York, 1928. Price, \$3.50.

Application of electric drive to steel mill and other work is no new thing. It is, however, something which has been growing rapidly in the past few years. This may be perceived by the fact that a list of rolling mill drives at the end of 1928 shows no less than 1667 units, whereas four years ago the total number was only 1108. This book by Mr. Fox, who is electrical engineer for Freyn Engineering Co., Chicago, does not confine itself to the one type of application, nor even to the one industry, but covers the field of motor applications for all the important industrial uses to which they are put.

Chapters are devoted to machine tools, elevators, mine hoists, other types of hoists, elevating and conveying machinery, traveling cranes, pumps, compressors, rotary blowers, fans of various types and other applications. In addition, there are chapters on selection and application of motors, starting and control equipment, mechanical features of the installation and electrical features thereof, as well as an introductory chapter detailing the advantages of electric motor drives.

In the preface it is noted that it is not possible, within the confines of a moderate size volume, to consider in detail the whole gamut of commercial machines. From the above brief listing, however, it will be seen that the book

does cover a wide variety of applications, and particularly those of greatest industrial importance. Illustrations are from both line drawings and photographs. Each was selected with the idea of bringing out a certain point and they number 170.

Some of the calculations required in the selection of equipment are given under the particular applications involved, while each chapter is followed by a brief bibliography pertaining to the subject matter of that chapter. The illustrations feature not only the drive equipment, but the units which are being driven, on the theory evidently that familiarity with these units is a prerequisite to intelligent selection of the type of drive required.

The publishers have made an easily readable book and most of the illustrations are of generous size.—S. G. K.

Determining Economic Pipe Insulation

Wirtschaftlichste Isolierstaerke bei Waerme- und Kaelteschutzanlagen und Waermeabgabe Isolierter Rohre bei Unterbrochener Betriebsweise. By Dr. I. S. Cammerer. Pages, 90, 6 x 8 in.; illustrations, 22; tables in text, 22. Published by Hernhaussen A. G., Berlin, Germany. Price, 6 marks.

The book tells what is the most economical thickness of non-conducting material for covering pipes, etc., and especially how much heat is given out by insulated pipes where the work is interrupted. It takes up continuous operation under what might be called normal conditions, giving the economical value of different thicknesses of various materials on pipes of various diameters, at temperatures from 100 to 400 deg. C. Tables give figures for pipes from 50 to 400 mm. (2 to 15½ in.) in diameter under all sorts of conditions, which enables proper choice to be made of insulator thickness for each case.

Little space is devoted to continuous operation during only one part of the year where the items of interest, depreciation, taxes and insurance come in very heavily, but the principles governing it are better considered in a section concerning regularly but frequently interrupted operations. The general principles governing this and the method of their application are covered competently and the statements backed by tables based on practical tests.

The influence on insulating efficiency of the utilization of the steam from the insulated supply system is also considered, being applicable to cases where the loss of technical, hence of economical, efficiency, caused by the lowering of temperature and pressure, or both, due to defective or at least not maximumly efficient insulation, may be greater than the loss caused by radiation alone. The author states his case and proves it concretely with tables and graphs.

R. G.

For the Training of Young Workers

Elementary Foundry Technology. Edited by L. A. Hartley. Pages, 423, 5½ x 8 in.; illustrated. Published by McGraw-Hill Book Co., New York. Price, \$3.

Foundry Work. By R. E. Wendt. Pages, 236, 5 x 7½ in.; 193 illustrations. Second Edition. Published by McGraw-Hill Book Co., New York. Price, \$2.

Sheet Metal Workers' Instructor. By Reuben Henry Warn and Joseph G. Horner. Seventh Edition. Pages, 224, 5 x 7 in.; 412 illustrations. Published by D. Van Nostrand Co., New York. Price, \$2.50.

Descriptive Geometry. By Prof. William H. Kirchner and Prof. Henry C. T. Eggers. Pages, 183, 6 x 9 in.; 99 illustrations. Published by McGraw-Hill Book Co., New York. Price, \$2.25.

Recognition of the importance of training young workers in the metal trades, as demonstrated by the increasing number of apprentice schools and training courses

that are being maintained in industry, has demanded a new technological literature, excellent examples of which are offered in the books mentioned above. Mr. Hartley's volume for the foundry industry, which has special reference to the gray iron and steel, is one of a series of texts which is being prepared to serve the foundry in school and in industry and conforms to the requirements for instructional material as set up in the Minimum Standards of Four-Year Foundry Apprenticeship in the United States. No attempt has been made to prepare a complete text on science or a general reference book on foundry technology, but the subject matter is intended to provide a guide for a course in foundry practice as might be offered in a typical foundry. At the same time emphasis is laid on the growth of scientific control of operations and processes in the shop.

The chapters on foundry sands were prepared by A. A. Grubb, director of laboratories for the Ohio Brass Co., Mansfield, Ohio, while the problems in electric steel foundry production, to which four chapters are devoted, were contributed by Maj. R. A. Bull, director of the Electric Steel Founders' Research Group. The first part of the book is devoted largely to basic scientific principles, while later sections are concerned with specific phases of foundry practice, such as the operation of the cupola and of molding machines. A glossary of foundry terms is of considerable practical value to the beginning student and the bibliography is more than adequate.

Mr. Wendt's treatise, now appearing in its second edition, contains considerable up-to-date information on the technical branches of the business, such as molding, dry-sand core-making and the melting and mixing of metals, and also deals at some length with foundry managers' problems. The subject matter of the earlier edition has been reorganized and many new illustrations have been added which make the book suitable to the latest needs of the foundry apprentice and his more experienced fellow workers.

The fact that the "Sheet Metals Workers' Instructor" is appearing in its seventh edition offers rather conclusive evidence of the changes in practice in this industry and also of the pains which are being taken to keep the beginning worker posted on the latest developments of his trade. The book first treats of the art of delineating the developed forms needed for the immense variety of shapes into which sheet metals are bent, calling for knowledge of applied geometry and mensuration. It then takes up the numerous forms of joints, with the method of union, and of tools and appliances. The construction of angles is shown by compasses, scales of chords, and set squares. Geometrical projection is taught by the usual methods.

Professors Kirchner and Eggers have intended their work for engineering and scientific students, and the emphasis is on fundamental principles. It works in well with the study of analytical geometry; assumes, very properly, a knowledge of mechanical drawing and of mathematics, as well as of elementary analytical geometry, and is intended to lead up to the further study of pure and applied graphics. The notation is simple and easily comprehensible from the very beginning.

In contradiction to some work on descriptive geometry, the analysis commences with four dimensions and refers all lines and points to the planes in a system of rectangular "Cartesian" coordinates. The supplementary exercises are well chosen and useful and the illustrations are well chosen.—R. G.

The part New Jersey once played in the iron mining industry of this country is recounted in "New Jersey—The Life, Industries and Resources of a Great State," recently published by the New Jersey State Chamber of Commerce, Newark. At one time this State led all others in the production of iron ore, the industry having been be-

gun in 1710. According to this book, there were once 89 mines in the State, the largest located in Morris and Sussex counties, and this territory was the center of the industry in the United States. The Hurdstown mine, abandoned in 1898, had reached a depth of 6000 ft. on the slope or 2600 ft. vertically.

Power Transmission Classified and Described

Mechanical Power Transmission. By William Staniar. Pages, 409, 6 x 9 in.; 324 illustrations; 56 tables. Published by McGraw-Hill Book Co., New York. Price, \$5.

Beginning with an enumeration of the 14 factors on which all theories, formulæ and methods employed in mechanical power transmission are based, this book then proceeds to take these up in turn and treat them in a practical and concrete way, the author drawing from the rich material at his command as mechanical power engineer for the duPont company and its subsidiaries. He divides all modern mechanical transmission systems into nine classes, omitting, however, those in which a hydraulic element is used in connection with purely mechanical means. Bearings and lubrication receive a great deal of attention, and belting is treated *in extenso*, with the rules and tables for power transmitted thereby.

That cast iron pulleys will stand acid fumes depends a good deal on the acid, and the author has not made or referred to experiments as to the relative driving power of wood-rim pulleys, with side-grain or end-grain friction surfaces. Nor does he go into the comparative driving power of different kinds of wood rims with each kind of belting.—R. G.

Industrial Processes Illustrated

The results of a study of industrial museums and museums of industrial art in 11 European countries, made at the instance of the National Society of Vocational Education, are to be published in 10 volumes, the first of which, entitled "The Industrial Museum," by Charles R. Richards, has been brought out by the Macmillan Co., New York.

Such a survey has been made necessary because the processes of production which underlie daily life in the United States and other industrial countries are confined in large factories and open to the inspection of only those who take part in them. Others must rely upon industrial museums to inform them as to how things are made, how existing appliances and processes have been developed and the effects of developments in one line upon progress or decadence in others. The book is liberally illustrated with full-page photographs, and the appendices are useful as a reference and guide in comparing existing museums and preparing for the founding of new ones.

Qualifications of the Sales Engineer

The Sales Engineer. By Gilbert Rigg. Pages, 112; 4¼ x 7½ in. Published by Mining Publications, Ltd., London. Price, 10s.

The object of this useful work is to show that the so-called "sales engineer" is neither a salesman nor an engineer, but an expert well versed in the physical and other properties of the materials produced by his firm, and having the power of analysis and induction, so that he can act as an expert intermediary between the producer and the consumer. Hence he should be able to smooth over rough places arising in the course of trade, due to ignorance or misapprehension of the circumstances under which the material or the appliance sold are to be

used and the method of their application. His function is stated by the author as "the making permanent friends for the company he represents." He "must have a leg in each camp."

Most of the illustrations are from American practice, and the author's experiences range through paint, rubber, galvanized iron, zinc castings, brass, and the various applications of sulfuric acid. But he evidently knows paint particularly well, and the book is an excellent treatise on pigments, especially the zinc series. Its concrete examples are all the more valuable because the names of the concerns with which the "sales engineer" had to do are given, thus inspiring confidence in the statements.—

R. G.

New Books Received

Impurities in Metals. By Colin J. Smithells. Pages 157, 6¼ x 9¼ in., illustrated. Published by John Wiley & Sons, 440 Fourth Avenue, New York. Price, \$5.

Iron and Steel in Wheeling. Limited edition of 1600 copies. By Henry Dickerson Scott. Pages 176, 8¼ x 12¼ in., illustrated. Privately published by the author at Wheeling, W. Va. Price, \$7.50.

Principles of Scientific Purchasing. By Norman F. Harriman. Pages 301, 6 x 9¼ in., illustrated. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, \$3.

Trade Associations, the Legal Aspects. By Benjamin S. Kirsh. Pages 271, 6 x 9¼ in. Published by Central Book Co., 93 Nassau Street, New York. Price, \$5.

Manufacturing Costs and Accounts. By A. Hamilton Church. Pages 516, 6¼ x 9¼ in., illustrated. Published by McGraw-Hill Book Co. Price, \$6.

The Shifting and Effects of the Federal Corporation Income Tax. Pages 251, 6 x 9 in., illustrated. Published by the National Industrial Conference Board, 247 Park Avenue, New York. Price, \$4.

Transactions of the American Foundrymen's Association. Vol. 36. Pages 934, 6 x 9¼ in., illustrated. Published by the Association, 140 South Dearborn Street, Chicago.

Transactions of the American Institute of Mining and Metallurgical Engineers. Vol. 76. Pages 755, 6 x 9 in., illustrated. Published by the Institute, 29 West Thirty-ninth Street, New York.

Cost of Government in the United States, 1926-1927. Pages 109, 6 x 9 in., illustrated. Published by National Industrial Conference Board. Price, \$2.50.

Proceedings of the American Society for Testing Materials. Part I, committee reports. Pages 1184, 6¼ x 9¼ in., illustrated. Published by the Society, 1315 Spruce Street, Philadelphia.

Proceedings of the American Society for Testing Materials. Part II, technical papers. Pages 904, 6¼ x 9¼ in., illustrated. Published by the Society.

Mechanical World Electrical Pocket Book, 1929. Pages 338, 4¼ x 6¼ in., illustrated. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Price, 1s. 6d.

Psychotechnische Berufseignungsprüfung von Giesereifacharbeitern. By Wilhelm Bültmann. Pages 78, 6½ x 9½ in., illustrated. Published by Julius Springer, Linkstrasse 23, Berlin W 9, Germany. Price, 7.50 m.

Technische Elektrochemie. By Jean Billiter. Pages 302, 6¾ x 9¾ in., illustrated. Published by Wilhelm Knapp, Halle (Saale), Germany. Price, 17.50 m.

Topographic and Geologic Atlas of the Pittsburgh Quadrangle. By Meredith E. Johnson. Published by Pennsylvania Geological Survey; Fourth Series, No. 27. Harrisburg, Pa. Price, \$1.

Machinery Industries Plan for Federation

Permanent Organization Proposed at Third Conference in Washington—
Manufacturers Seek More Help from Government

WASHINGTON, Feb. 19. — At the third conference of representatives of trade associations in the machinery and equipment and machinery industries, held here last Thursday, a committee was appointed to outline a plan for a permanent organization of the entire industry.

Among the organizations represented were the American Boiler Manufacturers' Association, the American Gas Association, the American Institute of Refrigeration, American Road Builders' Association, American Society of Mechanical Engineers, Associated General Contractors, Associated Machine Tool Dealers, Bakery Equipment Manufacturers' Association, Compressed Air Society, Dairy and Ice Cream Machinery and Supplies Association, Diesel Engine Society, Elevator Manufacturers' Association of the United States, Forging Manufacturers' Association, Foundry Equipment Manufacturers' Association, Industrial Truck Association, Machinery Builders' Society, National Laundry Allied Trades Association, National Crushed Stone Association, National Machine Tool Builders' Association, National Sand and Gravel Association, Pressed Metal Institute, Refrigerating Machinery Association, Society for the Development of International Combustion Power, Association of Manufacturers of Wood Working Machinery.

Another conference will be held late in April or early in May, the exact dates to be selected by E. F. DuBrul, general manager National Machine Tool Builders' Association.

Last week's conference, in addition to considering the proposal of a permanent organization, dealt with such subjects as commercial arbitration, trade practice conferences, uneconomic trade practices, elimination of unfair practices, free engineering service, trade-ins of old machinery and obsolescence.

Greater Government Assistance Needed

Creation of a federation that would enable the various associations to represent the entire industry has been a subject of discussion at previous meetings. One of its objects would be to obtain a greater share of the budget of the Bureau of Foreign and Domestic Commerce for use of the Industrial Machinery Division, which, it was stated, has only \$18,000 for the fiscal year beginning July 1, 1929, of a total allotment of \$4,257,357 for that bureau. This was held to be grossly inadequate to serve an industry which

has 10,000 members with an annual output valued at about \$5,000,000,000.

A committee to consider the correlation of statistics of the different Government branches, such as the Department of Labor, Department of Commerce and the Treasury Department, will consist of three members. Its appointment was urged by E. F. DuBrul so that the figures may be arranged more uniformly and so be better understood by the industry. They relate to such questions as employment, exports and imports, world markets, value of production by classes and income. Mr. DuBrul also suggested that the associations should interchange statistics among themselves to a greater extent than is now done.

It was at the further suggestion of Mr. DuBrul that a committee of three will be named to take up the matter of segregating group classifications under which imports of machinery are reported. He pointed out that it is not possible to learn under the present arrangement what items are included under the general group of "machinery and parts thereof." It was declared that imports of some kinds of equipment are affecting the domestic market and that American manufacturers should be in a position to study the figures for separate items. In this connection also Mr. DuBrul briefly referred to the necessity of reclassifying of items in the forthcoming tariff law and of breaking up general grouping whereby machinery comes into the United States under the basket clause of the metal schedule.

Commercial Arbitration Recommended

In taking up its formal program, the first subject discussed was "Commercial Arbitration," the paper being presented by W. W. Nichols, president Machinery Builders' Society, New York, and assistant to the president of the Allis-Chalmers Mfg. Co. He advocated arbitration for the settlement of disputes as to contracts rather than litigation, with its delays, high cost and ill feeling. He reviewed the work of the American Arbitration Association, its accomplishment in getting Federal and State laws on arbitration enacted and the good results which have risen from them.

Trade practice conferences were explained in detail by Fred A. Collinge, secretary-director Association of Manufacturers of Woodworking Machinery. The recent set of rules adopted by this industry following a trade practice conference under the auspices of the Federal Trade Commission was explained at some length.

Mr. Collins expressed the view that the rules give added strength to trade associations and are helpful to manufacturers and buyers.

A. S. Williams, Associated General Contractors, Washington, in discussing "Uneconomic Trade Practices," reported on what has been done in the direction of eliminating such practices, particularly excessive credits to contractors on the part of equipment manufacturers.

A survey made among machinery manufacturers showed that a great proportion of them found free engineering service a burden, according to a report made by Verne E. Minich, American Foundry Equipment Co., New York. There were some, however, who had not found it a burden. Mr. Minich related policies of different companies on the subject and expressed the view that there are instances where free service offsets profits entirely.

Chicago Machine Tool Trade-In Plan

The Chicago cooperative appraisal plan concerning machine tool trade-ins was explained by E. P. Essley, secretary, Associated Machine Tool Dealers. He said that the purpose is to make available to the prospective purchasers of new machine tools the best market and price for used equipment and that the plan also makes available through a central office, acting as a clearing house, outlets for used machines. Dealers appraise the used tools, naming a definite delivery point, and after registry has been made at the central office and the number is issued they make a firm offer. This firm offer will be made known to any member of the organization but names of those making the firm offers are not disclosed. The bid may be raised or lowered by any other dealer. Those making firm offers agree to take the machinery irrespective of whether they get orders for new equipment. Mr. Essley said that the plan had proved beneficial.

The discussion on "Obsolescence" was led by K. H. Condit, editor *American Machinist*, New York, who reviewed a survey completed four years ago on the subject in some of the machinery lines. Mr. Condit asserted that the question of replacing machinery now in use is one of campaigning and that progress has been made in this direction in certain lines. Mr. DuBrul declared that there is a tremendous amount of obsolete machinery in the United States and cited possibilities of its replacement with new equipment, among them the conducting of surveys and campaigns.

Electric Lift Truck Handles 15-Ton Dies

LARGE dies used in the manufacture of automobile bodies are now being handled to and from the presses in a 15-ton heavy-duty high-lift electric truck in the body plant of one of the Detroit automobile companies. Purchase of this truck followed the successful use of similar equipment.

tire operation is comparatively simple.

The truck is provided with a standard power axle as well as a fully inclosed motor. The driving mechanism is of heat-treated drop-forged alloy steel. The winch is a double-drum unit driven by an inclosed motor



The 15 - Ton Dies Are Taken from Storage Racks and Placed in Position on the Presses

Both machines were built by the Elwell-Parker Electric Co., Cleveland.

The lift truck illustrated, built for handling the 15-ton dies, has a cantilever type lift platform and is equipped with a winch. The machine operator uses the winch to draw the die from the die storage rack on to the truck platform. The platform is then lowered and the die transferred by the truck to the front of the press. Here the truck elevates the dies to the level of the press bolster. Then the winch cable is thrown over the dies and passed over the pulley in a split snatch block anchored in the far side of the press. The cable hook is returned and attached to a chain placed around the die. Then as the truck winch winds in the cable, the die is slid off the truck into position in the press. The truck operator controls all movements without leaving his position on the truck, and the en-

through worm gear reductions. Controls are of a safety type with interlocks, so that no fuses are used at any point.

Steering of the truck is by means of a wheel, through worm and gear reductions that run in oil. The six wheels are steered simultaneously. The drive wheel tires are 22 in. x 6 in. and the four wheels beneath the load have 15-in. x 7-in. tires. The double axle is of the articulated type to maintain a level frame while any pair of wheels may rise or fall as uneven runways are traveled. The bearings are of the Timken type. The load is carried by platform lift arms fitted with rollers that travel on heavy steel bars welded into channel uprights. Platform travel is controlled automatically by limit stops that cut off the power at predetermined points. The machine weighs between 5 and 6 tons.

tended to be tightened by hand, but also provided with faces so that a wrench can be used if it sticks.

Oxygen and acetylene hoses are direct connected without the usual screwed hose connections. Valves for adjustment of oxygen and acetylene pressure are placed on the handle in such a position that they can be operated by the thumb and forefinger of the hand holding the blowpipe, leaving the other hand free. The various welding heads take the same oxygen pressure, viz., 20 lb. per sq. in. The welder therefore can change the heads without adjusting the oxygen regulator.

Floor-Type Hand-Operated Winch

A FLOOR-TYPE hand-operated winch has been added to the line of motor and hand winches manufactured by the Stephens-Adamson Mfg. Co., Aurora, Ill. This winch has a cast iron worm gear, which is self locking. The rope pull at the drum is 750 lb. The cast iron drum, which is 6 in. in diameter, has a capacity of 100 ft. of ¼-in. cable and 60 ft. of ⅜-in. cable. From the top of the drum to the floor is 34 in., while the over-all width is 18 in. The hoist is attached to the floor by means of four bolts in the cast iron stand base. Alemite high-pressure fittings are used to lubricate the winch.



Universal Boring Machine Co. Moves Its Plant

THE Universal Boring Machine Co., Hudson, Mass., has purchased a plant in that city from the General Electric Co., and has moved most of its manufacturing equipment into the new plant. The former General Electric Co. plant is of brick and steel construction and much larger than the original Universal Boring Machine Co. plant.

J. C. Spence, formerly superintendent of the Norton Co.'s plant at Worcester, Mass., has purchased an interest in the Universal Boring Machine Co. and has been made plant manager. Charles A. Clarke continues as president of the Hudson company. A. H. Goodsell is associated with Mr. Clarke and Mr. Spence.

Establishments engaged primarily in the manufacture of hardware produced goods to the value of \$208,253,586 in 1927, a decrease of 7.5 per cent as compared with \$225,052,644 in 1925, the last preceding census, according to the Bureau of the Census.

Aircraft Blowpipe

A WELDING blowpipe weighing only 9 oz., designed especially for aircraft fuselage welding, has been placed on the market by Oxweld Acetylene Co., New York. Like other Oxweld blowpipes it is of the injector type and uses acetylene at atmospheric pressure.

Seven welding heads are supplied, each with a drawn copper tip rigidly

attached, curved to reach with ease the most inaccessible places encountered in aircraft welding. Each welding head is detachable as a unit and each injector can also be detached from the welding head and replaced if necessary. The welding head is connected to the body of the blowpipe with a double conical seat and is held in place with a knurled head nut, in-

Oxweld Blowpipe for Welding Aircraft Tubing



Polishing and Buffing Lathe with Long Spindle

FOR buffing automobile fenders and for other work requiring sufficient working space for two operators, the Hill-Curtis Co., Kalamazoo, Mich., has brought out a "Rite-Speed" pol-

ishing and buffing lathe having a spindle 80 in. in length.

A patented air cleaner which filters all air reaching the motor is claimed to maintain high efficiency of



The Long Spindle Provides Working Space for Two Operators. The spindle is driven by motor through multiple Texrope drive



ishing and buffing lathe having a spindle 80 in. in length.

The spindle is driven by motor through a multiple Texrope drive, the motor being mounted on the back of the pedestal of the machine as shown. This drive arrangement is featured as both positive and noiseless. Variation

the motor. Push button remote control with automatic starter and thermal overload protection and spindle lock are regular equipment. Tapered roller or ball bearings are optional equipment on the spindle. The machine can be furnished with 3, 5, 7½, 10 or 15-hp. motors, either a.c. or d.c.

Small Woodworker for Variety of Operations

TWENTY-NINE operations, including dadoing, routing, mitring, shaping, grooving, rabbeting, mortising, tenoning and gaining, may be done on the woodworker illustrated, which is being manufactured by the DeWalt Products Corp., Leola, Pa.

This machine, named the Junior, has many of the features of the company's larger "Wonder Worker" general-purpose woodworking machine, including balance in all cutting positions, and change from cross-cutting to ripping without stopping the motor. An accurate ripping gage is provided as well as dials to facilitate making adjustments. A special feature is the roller bearing arm that

carries the motor unit. The driving motor is of universal type and takes current from any light socket. Saws and other tools may be changed easily and quickly. Pieces to be cross-cut, ripped, shaped or otherwise worked upon are handled from one side of the table and layout marks are always in plain view.

With the 12-in. combination cross-cut and rip saw furnished, 2-in. stock is said to be ripped at the rate of 20 lineal ft. per min. Routing of rise and tread stringers is accomplished at the rate of one a minute.

The machine is mounted on a 29-in. by 59-in. wooden table. It is compact and may be carried by two men and



With the Standard Combination Cross-Cut and Rip Saw, 2-In. Stock Is Ripped at the Rate of 20-Ft. per Min.

set up on a pair of horses, or moved about on a truck. The weight is 235 lb. Standard equipment includes an adjustable saw guard.

Small Hydraulic Press for Baling Light Scrap

A SMALL press for baling sheet scrap or other light material by hydraulic pressure has been put on the market by Samuel H. Garrett, 234 North Thirteenth Street, Philadelphia. The machine is intended for consumers of the lighter forms of steel who do not have need for a large press.

In this press the manufacturer has combined rapid and powerful toggle movement with a 12-ton hydraulic ram. The toggle movement does the initial packing of the scrap and the

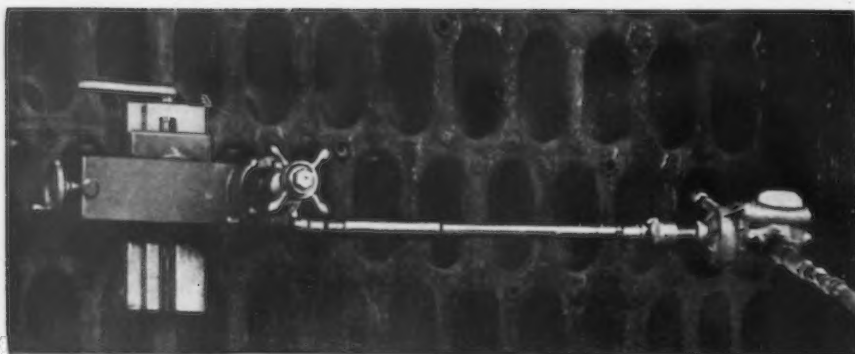


Portable Mounting Permits Moving the Press to the Scrap to Be Baled

hydraulic ram gives the bundles the necessary density.

The press turns out bundles 12 in. wide and 20 in. long, with a height of 12 to 18 in., depending on the character of the material, which will also govern the weight of the bundles. The press weighs only 375 lb. It is rigidly constructed and the various members are of steel having high tensile strength. The press is mounted on truck wheels so that it can be moved to the scrap pile instead of having to move the scrap to the machine. The trade name of the press is Tempus No. 5.

A 46-in. 2-high universal plate mill for the new Ambridge, Pa., plant of the A. M. Byers Co., together with tables, straighteners, shears and other auxiliary equipment, will be furnished by the Morgan Engineering Co., Alliance, Ohio.



Portabe Machine for Back-Facing Boiler Handholes

THE illustration shows a portable machine for back-facing the inside of handholes in steam boilers to make a good bearing seat for the handhole cover. The machine consists essentially of a spindle for holding a cutter incorporated in a cross-slide mounted on a base that can be clamped to the face of the boiler. A universal-joint drive permits the use of an electric or an air drill for power.

A ratchet feed provides for longitudinal travel of the cross-slide on the base. The transverse travel of the cross-slide is universal. This combination of movements makes it possible to bring the spindle in position above the handhole after the machine has been clamped to the boiler. The spindle and cutter can then be lowered into the hole by the nut feed. The latter also makes it possible to bring the cutter quickly into contact

with the work. A hardened collar next to the cutter bears against the rim of the hole and serves to protect the spindle from damage.

The machine, a product of the Davenport Mfg. Co., Meadville, Pa., is designed for heavy duty. The spindle is of alloy steel and thrust is taken by a ball bearing at the top of the feed nut. The clamping nut for locking the spindle is integral with the housing.

The shaft is connected with the spindle by a worm drive and, by loosening four nuts, the worm housing can be adjusted to accommodate the driveshaft from four different angles. This adjustment allows the drill that supplies the power to be located in the most convenient position on the job. The machine can be furnished without the worm drive for use in connection with a drill press.

Grinder for J & L Automatic Die-Head Chasers

TO provide quicker and more accurate means of sharpening chasers for its J & L automatic die heads, the Jones & Lamson Machine Co., Springfield, Vt., is introducing a special grinder consisting of a $\frac{1}{4}$ -hp. motor mounted on a pedestal base that occupies floor space of 20 x 20 in. A 3450-r.p.m., 110-volt, 60-cycle motor is furnished unless otherwise speci-

fied. Features of the machine are simplicity, accuracy and complete protection of all working parts from emery.

To provide for the two distinct grinding operations each side of the grinder is designed to take independent set-ups. Micrometer adjustments reading in thousandths are furnished on each side, as well as on the verti-

cal elevating screw. Parts of the regular J & L chaser sharpening fixture are employed for holding the chasers. Angular adjustment for chamfer is provided on the swinging slide and angular adjustment for top rake angles on the horizontal side. The pinion handle for operating the horizontal slide is adjusted for position merely by withdrawing the pinion from the rack pieces and adjusting the handle to suit the slide travel.

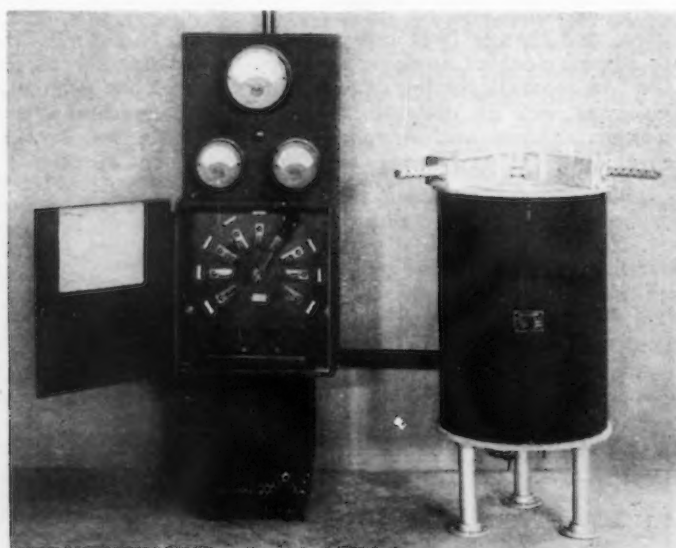
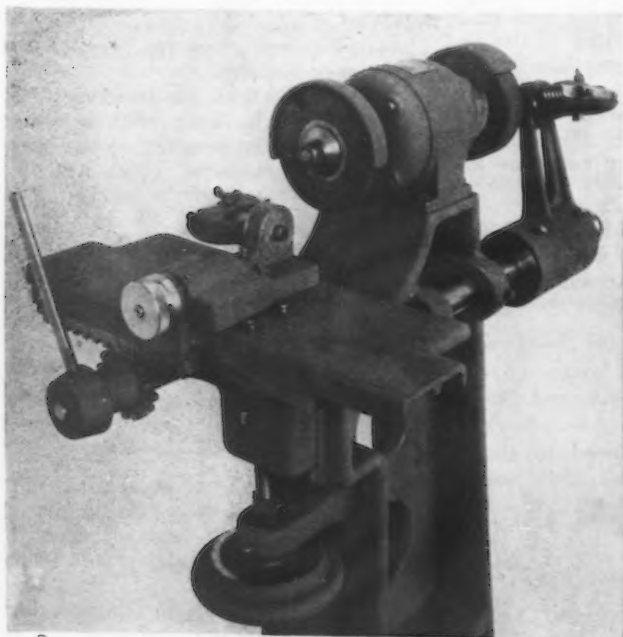
Heat-Treating Furnaces and Controls

NEW apparatus for steel treating, brought out by the Hevi-Duty Electric Co., Milwaukee, includes a magnetic hardening furnace.

Fundamentally, the electro-magnetic furnace differs but slightly from other heat-treating furnaces, in design or operation. It consists of the usual type of box or vertical furnace, but is equipped with electrical circuits to establish a magnetic field through the work and a meter to measure the strength of this field. The circuits are so arranged that no deflection of the needle occurs with the furnace empty. But when steel is placed in the furnace, the meter immediately indicates an increase in the strength of the field caused by the magnetic properties of the steel.

When the steel is heated to its critical point throughout its entire mass, the needle returns to zero, thus indicating that the critical point is reached. This process of heat treating is adapted to all straight carbon steels of more than 0.4 per cent carbon, and alloy steels whose critical temperature is below the safe working limits of the furnace.

Use of this furnace is said to insure accurate duplication of results, and maximum hardness and to determine an exact point from which further processes may be conducted. As the magnetic function is independent of the furnace temperature, maximum production can be obtained.



(Above) Electro-Magnetic Heat-Treating Furnace and Controls Chasers Are Sharpened Rapidly and Accurately by Machine at Left

Late Blast Furnace Plant Developments

Recent Accomplishments and Experiences Discussed at Meeting of Furnace and Coke Oven Operators

BLAST furnace and coke oven operators, who attended the mid-winter meeting of the Eastern States Blast Furnace and Coke Oven Association (an all-day conference at the William Penn Hotel, Pittsburgh, Friday, Feb. 15), completed about as big a program as ever before was attempted in a single day. No fewer than eight topics were discussed at a morning session of the blast furnace men and, coincidentally, the coke oven operators were disposing of a list of six subjects bearing on the problems of coke oven operation. There were five topics in the program of a joint session of the two divisions of the association in the afternoon, a total for the day of 19, which was generally conceded as too great a number, since discussion of each was necessarily limited.

It is probable that the program committee at future meetings will reduce the number of matters to be presented for discussion and thus allow more complete consideration of each. It was commented at the blast furnace sectional meeting that too many data were given and that there was not enough expression of personal opinions, but there was little doubt the exchange of experiences was profitable to all present.

Of more than ordinary importance was the passage at the conclusion of the afternoon session of a resolution placing the association on record as heartily in sympathy with the work that has been done by the United States Bureau of Mines in its blast furnace investigations; as favoring the continuance of the work and offering its cooperation in an effort to secure the assistance of the owners of the steel industry.

Furnace Gives 1006 Tons Daily Output

Discussion of the merits of the wide-hearth blast furnace left no doubt that those who have been operating furnaces with hearth diameters of 22 ft. or more are entirely satisfied with their performance, whether viewed from the standpoint of the quality of the pig iron produced, smoothness of operation or furnace economy. One speaker described the operation of a furnace 90 ft. high, with hearth diameter of 24 ft. 6 in., bosh diameter of 26 ft. 3 in., bosh angle of 86 deg. 14 min., fourteen tuyeres, 17 ft. stock line and 12 ft. 6 in. large bell, which, running on a mixture of 70 per cent Mesabi and 30 per cent Old Range ores, blowing 71,000 cu. ft. of wind per minute at

a pressure of 19 lb., had a daily average output in 1928 of 1006 tons, no scrap other than works' scrap being used. The furnace was tapped five times daily. Dust averaged 261 lb. per ton of iron. Average coke consumption was 1951 lb. per ton of pig iron, the coke used being made from 85 per cent high and 15 per cent low volatile coal. The sinter charged ranged from 15 to 40 per cent.

Annular space between the large bell and the furnace lining came in for very full discussion, and it was pretty commonly agreed that some expansion of the clearance beyond 2 ft., which had in recent years been regarded as standard practice, was very helpful in reducing the velocity of the gas and consequently in keeping down the amount of flue dust. The more common practice in increasing the clearance was in reducing the size of the large bell, because of the greater cost of rebuilding the top of the furnace to provide the greater space.

There was some division of opinion as to the merits of the use of cooling plates in the furnace above the mantle. Some found furnace operations helped and others that they were adversely affected by use of the cooling plates. Successful installation was usual when the plates were placed well back against the shell of the stack.

New Type of Hot Stove

A new type of blast furnace stove is being tried on one of the Mingo works furnaces of the Carnegie Steel Co. This stove has a conical top, with a taper from the body diameter of 21 ft. to 8 ft. and the use of the burner in the top.

Discussion of the sintering of fines from dry cleaners developed to some extent into a discussion of the merits of the dry and wet cleaning methods and brought out that many operators had difficulty in sintering dry cleaner fines without first moistening them, or mixing them with flue dust. There is not sufficient carbon in dry cleaner fines for successful sintering, some said.

Coke from Stocked Coal

The afternoon session brought out that many coke oven operators had as good or better results from stocked as from freshly received coal, but it was also asserted that the decline in the structure, as stocked coal ages, has an adverse effect upon coke as shown by the shatter test. The

method of stocking has much to do with the quality of coke made from stocked coal, one speaker said, and the plan followed at his plant of stocking in 3-ft. layers and then smoothing and rolling each layer had resulted, so far as the quality of the coke produced went, in preference for stocked over fresh coal. The kind of coal was important, and some speakers said that Illinois and Utah coals could not be stocked, since coking value was lost unless they were promptly used.

No fewer than 21 factors were advanced as responsible for the production of flue dust, the first and last putting much of the burden upon coke, especially its screening. Gas velocity, movement of the charge, pressure conditions and the physical quality of the charge were among other factors that were advanced as worthy of study for a solution.

In his talk, "Fuels of the Future," M. R. Campbell, principal geologist, Department of the Interior, warned of the approaching danger of the exhaustion of high-grade metallurgical coals.

Steel Corporation Forms Advertising Committee

An advertising committee of the subsidiary manufacturing companies of the United States Steel Corporation has been formed, with H. V. Jamison, advertising manager American Sheet & Tin Plate Co., Pittsburgh, as chairman. Direction and handling of advertising activities are to be carried on in two groups or divisions, with special group counselors to supplement the present work of the individual company advertising departments.

The Pittsburgh group comprises the American Bridge Co., American Sheet & Tin Plate Co., Carnegie Steel Co., Lorain Steel Co., National Tube Co., Tennessee Coal, Iron & Railroad Co., and the United States Steel Products Co. The counselors for this group are W. L. Schaeffer, National Tube Co.; R. L. Twitchell, Carnegie Steel Co., and H. V. Jamison, American Sheet & Tin Plate Co.

In the Chicago group are the American Steel & Wire Co., Cyclone Fence Co., Illinois Steel Co., Minnesota Steel Co. and the Universal Portland Cement Co., while the group counselors are C. R. Moffatt, Illinois Steel Co.; M. A. Berns, Universal Portland Cement Co., and W. H. Cordes, American Steel & Wire Co.

Plan to Regulate Trade Groups Opposed

Recommendation of Federal Trade Commission That Trade Associations Be Licensed Not Likely to Become a Law

WASHINGTON, Feb. 19.—Recommendations made in the report of the Federal Trade Commission to the Senate on open-price associations, as outlined in THE IRON AGE last week, are not believed likely to be enacted into law. This is particularly true of one of the outstanding suggestions which proposed that trade associations be licensed by the Federal Government. Reading of the recommendation in its entirety discloses the extent of Government interference with business if the licensing system were adopted as proposed. It includes a condition that all files, records, accounts, correspondence or other documents of associations shall be available to the inspection of specified Government authorities. Moreover, the associations would be required to make special reports regarding their organization, business or practices as would be required by the Government authorities.

Going further, the report states that "it is important to include among the trade associations subject to such regulation those whose members may not be engaged directly in interstate commerce if the commodities dealt in by their members (or the products thereof) move in interstate commerce and are affected in quality, supply or price by the activities of the trade association of which they are members."

Lacks Approval of Part of Commission

It is also recommended that the suggested law should provide that all associations collecting, tabulating or circulating statistics may be required to furnish a duplicate copy of each report sent in by members of the association for inspection by some appropriate department or bureau of the Government, and that copies of all compiled reports of associations to members may similarly be required to be filed. There should be unquestioned access for properly accredited Government agents to files of trade association correspondence and other records, the report says, which should be protected further by the prohibition of the destruction of such correspondence and records until held for perhaps five years. With regard to securing an adequate record of what occurs at association meetings, the report declares that it might be desirable sometimes to provide a public stenographer. Capping this rather sweeping proposal, the report mentions that it has been suggested by a trade association man of large experience that some Government bureau should have a corps of stenographers assigned to the duty of making records of trade association meetings systematically as they occur. "The idea is interesting," the report continues, "but is mentioned here as a

suggestion for discussion rather than as an item in any immediate program of supervision of trade associations."

It is plain that the report does not meet with the approval of the entire commission. This was made clear by the statement of Commissioner William E. Humphrey to THE IRON AGE indicating that the commission did not indorse the recommendations of the chief economist, the one who prepared the report. Moreover, Mr. Humphrey said that the commission does not sanction many of the expressed opinions in the report. As an example, he referred to the licensing system, which he strongly opposes.

The report, with a letter of transmittal signed by Chairman Edgar A. McCulloch, is probably the most exhaustive study of trade associations ever made. It consists of 12 chapters, which deal with all conceivable kinds of trade associations and their many activities. Many associations are listed in the report and their activities described. Only passing reference is made to those in the iron and steel, machinery, foundry and related lines. The report, however, holds that there are no outstanding general differences between open-price and other types of associations. On the whole, it is sympathetic toward trade association work and recognizes it as an important and fixed institution in the economic and industrial life of the nation. Open-price work, the report declares, is not so much the function of a particular type of association as one activity among a number of others engaged in by all sorts of trade associations. It is stated that there is no clear and generally accepted definition.

Trade Associations a Constructive Influence

Reflecting the side of the report favorable to trade associations, it is stated that "even though trade associations may have, in many cases, a past that falls within the shadow of the anti-trust laws, and even though such organizations may easily overstep the line and be exploited in the interest of illegal and anti-social ends, trade associations as a whole are believed to be a highly constructive influence in the business world whose importance is bound to increase and whose work, if truly constructive, will be increasingly appreciated."

The report asserts that there is an apparent need for nicer discrimination in trade association circles as regards matters and policies affecting the public interest. This remark leads up to the suggestion concerning identification of statistical information, which is strongly opposed.

"No change in the anti-trust laws is proposed," the report continues, "but in one respect their practical

application might well be clarified or extended. The circulation of price and statistical information in a form to identify the results for individual members is unnecessary to the general statistical work of associations and so susceptible of abuse that it might explicitly be declared illegal, irrespective of intent. The impropriety of the practice of members of an association of giving information as to the 'minutest details of their business to their rivals' in what purport to be statistical reports was adverted to by the Supreme Court in the Harwood case. In the Maple Flooring case, the court emphasized the absence of identification of members in association statistical reports as evidence of the legality of their purpose and use; while in the Cement case, a system of detailed reports on specific job contracts was accepted because of its use to prevent a particularly objectionable form of speculation."

It is stated that at least 20 trade associations had submitted plans to the Department of Justice down to the spring of 1928, and that the department had usually replied that it could state no general rule on the question of legality, but would be glad to inspect any definite proposal and point out any objectionable features. It might also be desirable to have the projects of interpretation brought to the attention of the proper Government department at their inception, and it is only fair, says the report, that if business men are encouraged to bring such projects to the attention of the Government, they be given such qualified advice as it is possible to give in response to their frankness and evident desire to conform to the law. It cannot be expected, however, that any Government department can undertake to give definite advice in advance such as will assure any person who wants to experiment with new methods of dealing with business questions that he will not come in conflict with the law.

Price Making Practices Discussed

In the course of a discussion on the variety of price making practices as a statistical problem, the report points out that "in some industries there is in use a basing point system of quoting prices which somewhat facilitates statistical comparison. Steel prices were formerly quoted on a Pittsburgh base, but are now quoted f.o.b. Pittsburgh, Chicago, Birmingham, etc. In this case the price made to the buyer at a given point includes an element ascribed to freight, which is uniform regardless of the point (within a large area) from which the commodity is shipped. This system applies in many industries, especially where production is highly concentrated. The one-time concentration of steel production in the neighborhood of Pittsburgh had much to do with the use of Pittsburgh plus, which continued after the industry had become comparatively decentralized. Sometimes the concentrated market in which sales are made becomes a basing point because ware-

houses are built in that neighborhood, even though the production may be somewhat scattered or at some distant point. The basing point practice is declared to have some advantages for the price statistician. In relation to the present inquiry, it is to be noted, however, that such a system favors uniformity of prices, either through facilitating the practice of following the leader or through the increased ease with which price agreement may be made where the basing point is already in effect."

In the multiplicity of subjects treated, the report gives some attention to what it terms "the lying buyer." It is declared that the buyer would possibly be more frank and honest in his dealings with sellers if he did not feel that the seller conceals from him information relevant to the proper price to be paid for the article. Price reports, and perhaps more especially cost reports, made available to buyers and subjected to

analysis by them, might so educate the buyer that he would not resort to extreme tactics, it is explained, partly because he would not need to start out with the assumption that the seller will charge an unreasonable price if possible. Some trade associations have reported that, by following a policy of checking up on prices quoted, there has been a decrease in differences between sellers and buyers over prices, the former having adopted a practice of making firm prices.

Hesitancy in Opening Records

The report states that only one association definitely, and after due and formal request, refused to grant to the commission's agents access to records and correspondence filed. Hesitancy and lack of cordiality in submitting records for examination, however, was not infrequent.

In dealing with what it calls questionable activities, the report says that "the minutes of meetings of some or-

ganizations are regularly edited by legal counsel and members told to write nothing which might appear questionable. Trade association executives have become educated, and have, in turn, educated their members, in the use of guarded language. There has thus developed a trade association 'lingo,' which is becoming more and more generally used. For example, the statement that 'the consensus of opinion of the members present was that conditions warranted an optimistic view of the future,' may mean that an agreement was reached to advance prices. Very little imagination would be required to translate such a statement as the following into an exhortation to members to raise prices: 'If there ever was an industry, and a period in the life of that industry, when all the conditions affecting the business justified sales courage and a selling price commensurate with cost, certainly that industry is our own and the time is the present.'"

Starts Group Activities for Iron Castings

Gray Iron Institute Appoints Committees Looking to Broad Business Promotional Work

IMPORTANT problems pertaining to the gray iron industry are being taken up by the Gray Iron Institute, Terminal Tower Building, Cleveland, through a group of committees whose appointment has just been announced by Arthur J. Tuscany, manager. These committees have already started definite steps toward solving many of the difficulties of the gray iron foundry industry. There are committees on merchandising, research, cost, finance and budgeting and statistics. In addition a trade practice committee will soon be announced.

To Set Grades for Different Castings

The merchandising committee will give attention to important problems of merchandising. The first of these is a set of uniform trade customs covering the relations between the buyer and seller of castings. There is said to be a decided need for something of this kind to eliminate misunderstandings that have been prevalent for a long time. The next subject which this committee will devote attention to is the matter of standardized grades of gray iron for various types of castings. On this subject the committee will work closely with the research committee. The committee will also prepare a folder containing information on gray iron castings which will be furnished to members to send to their customers.

The research committee will give attention to the classifying of gray iron as now made in various grades based on physical and chemical values. The cost committee plans to prepare a cost system uniform in principles, which can be used by the

smaller foundries, but which will be sufficiently flexible so that larger plants that desire can use such parts of it as they deem desirable.

To Distribute Statistical Information

The statistical committee has prepared a plan for the collection and distribution of statistics which will be published monthly and will give such information as normal production of the foundries reporting, actual production, unfilled orders on hand, new business received and a composite of the business outlook.

The trade practice committee will work out plans for eliminating many of the harmful trade practices and abuses.

The new committees are:

Cost Committee.—J. L. Carter, Sacks-Barlow Foundry Co., Newark, N. J., chairman; William F. Bornfleth, Cream City Foundry, Milwaukee; A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill., and P. E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, Ohio.

Finance and Budget Committee.—H. J. O'Neill, Western Foundry Co., Chicago, chairman; H. S. Chafee, Builders Iron Foundry, Providence, R. I.; H. R. Lafferty, Red Jacket Mfg. Co., Davenport, Iowa; F. L. Squires, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., and H. C. Wilson, Cleveland Co-operative Stove Co., Cleveland.

Merchandising Committee.—Don McDaniel, Decatur Casting Co., Decatur, Ind., chairman; J. H. Bruce, Bowler Foundry Co., Cleveland; H. R. Cooke, Olney Foundry Co., Philadelphia; H. Martin, Detroit Gray Iron Foundry Co., Detroit; R. R. Monroe, Des Moines Foundry & Machine Co., Des Moines, Iowa; H. S. Washburn, Plainville Casting Co., Plainville, Conn.

Research Committee.—B. H. Johnson, Cresson-Morris Co., Philadelphia, chairman; Hyman Bornstein, Deere & Co.,

Moline, Ill.; J. D. Coltman, Bullard Co., Bridgeport, Conn., and E. J. Lowry, consulting metallurgist, Detroit.

Statistical Committee.—K. L. Green, Green Foundry Co., St. Louis, chairman; Harry Graham, Bond Engineering Works, Toronto, Canada; William J. Grede, Liberty Foundry, Inc., Wauwatosa, Wis.; W. F. McCarthy, McCarthy Foundry Co., Chicago, and Wallace E. Stephen, Roberts & Mander Stove Co., Philadelphia.

Steel Corporation Merges River Fleets

As on March 1, the United States Steel Corporation is consolidating its river activities by placing the facilities of the American Steel & Wire Co., consisting of one steamer and 15 barges, under the control of the Carnegie Steel Co. The latter for some time has been handling the river shipments of steel products of the several United States Steel Corporation subsidiaries whose plants are in the Pittsburgh district, but the marine department of the American Steel & Wire Co., which was the first of the Pittsburgh district steel companies to use the inland water ways for distant shipments of steel products, has been continued as a separate entity. This consolidation will place under the control of the marine department of the Carnegie Steel Co. 15 tow boats, three of which are of the large Mississippi River type, and 465 barges. The step is taken in the interest of efficient operation and overhead economies.

The Western Electric Co. is now employing 31,750 workers at its Hawthorne Works, Chicago, according to an announcement made by Charles L. Rice, vice-president and manager. The total represents an increase of nearly 10,000 workers during the last year, 3000 of whom are engaged in the manufacture of sound picture apparatus.

Chemical Exposition to Be Held in May

Instead of meeting during the autumn, the twelfth Exposition of Chemical Industries will be held this year in Grand Central Palace, New York, May 6 to 11. Included in comprehensive exhibits of equipment will be shown many of the well known corrosion resisting steels and alloys, together with some newly developed combinations for special service.

Dr. Moldenke Addresses New England Founders

Dr. Richard Moldenke of Watchung, N. J., an honorary member of the New England Foundrymen's Association, was the guest of that organization at its February meeting on Wednesday evening, Feb. 13, at the Exchange Club, Boston. Dr. Moldenke's address was informal and touched on some of the recent developments in foundry practice, both in this country and abroad.

He charged those present to remember that we are living in an age of consolidations, made necessary by the tremendous increase in manufacturing costs and by keen competition. The purpose is to increase production, lower manufacturing costs and to produce a better product. The key to the foundry situation today, he said, is to know how to run the cupola. It was asserted the average foundryman has a pretty good idea of mixtures and coke, but knows comparatively little about scrap. "And scrap," Doctor Moldenke said, "is rapidly becoming an important factor in the foundry as well as in the steel mill."

Some of the latest developments in the use of molding sands, and in molding machines, notably the specialized molding machine of today, were briefly explained. Also how some of the European foundries are securing a dry air for blast by first cooling it to certain temperatures and then preheating, processes that Dr. Moldenke believes will be in use throughout the United States before many years pass.

Preparing the air in this manner does much to eliminate slag. The cupola is such a simple contrivance it is a difficult matter, in the opinion of Dr. Moldenke, to improve it, consequently he believes that several processes tried out on the other side of the Atlantic to improve the quality of iron and to speed up production have little if any value. In connection with Germany he said that foundry workers in that country are endeavoring to secure a mark an hour, and that the time surely is coming when Germany, because of the cost of labor, will be forced out of the export market.

Reference was made to a French cast iron pipe manufacturing plant, at which pig iron is produced at \$10 a ton. The company has been an active competitor of domestic pipe foundries in the United States, but attention was called to the fact that the

French producers have experienced much trouble with cracked pipe. The last part of Doctor Moldenke's address concerned the social side of his recent trip to Spain in connection with the Barcelona Foundry Congress.

Carl S. Neuman, Union Mfg. Co., New Britain, Conn., president of the association, read an invitation from the New England Brass Founders to join with them on Wednesday evening, Feb. 27, at the Engineers Club, Boston, in welcoming Leroy P. Robinson, sales manager of the Werner G. Smith Co., Cleveland, and formerly New England representative of the Sterling Wheelbarrow Co., Milwaukee.

Electrochemists on Aeronautics

The fall meeting of the American Electrochemical Society will be held in Pittsburgh, Sept. 18 to 20. A symposium for that convention will be "Contribution of Electrochemistry to Aeronautics." Charles A. Styer has been appointed chairman of the local committee.

Steel Fabricators to Adopt Code of Selling Practices

A committee to draft a code of standard selling practices for the structural steel industry has been announced by Charles N. Fitts, president American Institute of Steel Construction, to carry out the policy outlined at the last annual convention of the institute. The committee will prepare a draft of a code and submit it to the institute for formal adoption. The committee is as follows: Robert T. Brooks, chairman, Geo. A. Just Co., Long Island City, N. Y.; T. J. Foster, National Bridge Works, 5050 Grand Central Terminal, New York; A. M. Conneen, Jr., Hedden Iron Construction Co., Hillside, N. J.; H. E. Detwiler, Anthracite Bridge Co., Scranton, Pa.; R. L. Kift, Lehigh Structural Steel Co., Allentown, Pa.

So that the work is in keeping with all local requirements and conditions, the following regional contact committeemen have been appointed to cooperate with and assist the general committee: Baltimore, William C. Schnabel, Dietrich Brothers; Birmingham, R. I. Ingalls, Ingalls Iron Works Co.; Buffalo, G. S. Kellogg, Kellogg Structural Steel Co.; Canada, A. Ross Robertson, Dominion Bridge Co., Toronto; Chicago, John J. Duffin, Duffin Iron Co.; Denver, A. G. Fish, Midwest Steel & Iron Works Co.; Detroit, L. J. Knapp, Whitehead & Kales Co.; Indianapolis, R. H. Dickson, Robert Berner Structural Steel Co.; Kansas City, Kan., Neil G. Lilley, Kansas City Structural Steel Co.; Milwaukee, A. C. Bell, Wisconsin Bridge & Iron Co.; Minneapolis, W. D. Timperley, Crown Iron Works Co.; Ohio, J. E. Miller, Bellefontaine Bridge & Steel Co.; Omaha, Karl Vogel, Omaha Steel Works; Philadelphia, Dr. Frank Parker, Struct. Steel Board of Trade, Philadelphia; Pittsburgh, G. E. Klingel-

hofer, Pittsburgh Bridge & Iron Co.; Richmond, R. P. Liphart, Richmond Structural Steel Co.; San Francisco, Paul Gillespie, Judson-Pacific Co.; Seattle, Cecil H. Bacon, Bacon & Matheson Forge Co.; St. Louis, J. W. Thomsen, Stupp Brothers Bridge & Iron Co.; Texas, Melrose Holmgreen, Alamo Iron Works, San Antonio.

Sees Stock Market Inflation as World Menace

Commenting on the Federal Reserve Board's statement of Feb. 6 calling attention to the threatened falling off in business because of the increasing cost of commercial credit, Alvin T. Simonds, president Simonds Saw & Steel Co., Fitchburg, Mass., in the March 1 issue of *Looking Ahead* says, in part:

"Is there not a time when confidence that all is going well in business and is to continue going well should be undermined? Isn't that what the Federal Reserve Board statement has done? Let us ask another question. Why was it not done earlier, before the situation had become so serious? Not since 1919-1920 has there been such a rapid increase in commercial rates as that of the first nine months of 1928. From the beginning of 1928 this became a 'strain' on business activity."

Mr. Simonds calls attention to the fact that stock market speculation has increased the cost of commercial credit not only in the United States, but also in Great Britain. The Bank of England's recent advance in its rediscount rate from 4½ per cent to 5½ per cent was the most drastic change of the sort since the crisis of 1920 was coming into sight.

"Stock speculation in the United States," he says, "increases the cost in England of money borrowed for carrying on business. The increased cost there causes increased cost in continental Europe, and so on."

He emphasized the world-wide effects of speculative excesses. "It is generally agreed," Mr. Simonds states, "that our prosperity in time of peace is greater when other nations are prosperous. Hard times in Europe will reduce our prosperity. So far as general welfare is concerned, the time is fast coming when the world must be considered as a single variable."

Mr. Simonds' article is illustrated by a chart showing that a turn-down in business is approaching and that the turning point will probably come in 1929. "Our estimate puts the date at about April, 1929; but it may not come until fall, as it did in 1926. We fear, however, that it will come earlier, because of the decided falling off in building contracts from the June, 1928, index of 107 to the January, 1929, index of 86."

Preliminary specifications for structural nickel steel and ferro-titanium have been issued by the Federal Specifications Board, Washington.

Mining Engineers Receive Bust of Hoover

Sessions of Iron and Steel Division—Howe Memorial Lecture on Manganese Steel

THE first technical sessions under the auspices of the newly formed Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers are being held this week during the 137th general meeting of the institute at the Engineering Societies Building, New York, Feb. 18 to 22. An unusually large attendance is a feature of these meetings, and the papers are particularly noteworthy. Jointly with these meetings there are also being held enthusiastic technical sessions of the Institute of Metals Division of the society.

Institute Presented with Bust of Hoover

A feature of the annual meeting of the institute Tuesday morning, Feb. 19, was the formal presentation to the institute of a large bust of Herbert Hoover. Mr. Hoover is a past president of the society, was the recipient of unusual honors at the annual meeting in February a year ago, and has been very prominent in the activities of the institute for many years. The bust is the gift of C. A. Fisher, geologist and petroleum engineer, Denver, Colo. The donor could not be present and in his absence Dr. H. Foster Bain, secretary of the institute, made the formal presentation.

New Officers Elected

At the same meeting officers for the ensuing year were formally elected. They are as follows:

President: F. W. Bradley, San Francisco, Cal., president Bunker Hill & Sullivan Mining & Concentrating Co., and also president of the Alaska Juneau Gold Mining Co., as well as several other gold and silver mining companies.

Vice-Presidents: Edgar Ricard, mining engineer, 42 Broadway, New York, and H. A. Buehler, State geologist, Rolla, Mo.

New Directors: Francis W. Paine, Paine, Weber & Co., Boston; Eugene McAuliffe, president Union Pacific Coal Co., Omaha, Neb.; Erle Z. Daveler, general manager Butte & Superior Mining Co., Butte, Mont., and W. R. Wright, manager Ford, Bacon & Davis, Inc., Chicago.

Sessions on Iron and Steel

Three papers were read and discussed at the steel session Monday morning. These were, respectively: "Gases Extracted from Iron-Carbon Alloys by Vacuum Melting," by N. A. Ziegler, Westinghouse Electric & Mfg. Co., East Pittsburgh; "Basic Open-Hearth Yields," by C. D. King, United States Steel Corporation, New York; "Unreduced Oxides in Pig Iron and Their Elimination in the Basic Open-Hearth Furnace," by C. H. Herty, Jr., and J. M. Gaines, Jr., United States Bureau of Mines, Pittsburgh. Each paper was discussed briefly, as will be noted from the following paragraphs. Abstracts of the papers will appear in a subsequent issue. Dr. G. B. Waterhouse, professor of metallurgy, Massachusetts Insti-

tute of Technology, Cambridge, was in the chair.

Volatile metals such as manganese and aluminum will volatilize in the furnace before they melt, according to Dr. H. W. Gillett of the United States Bureau of Standards, Washington. The metallic vapors from this source will add to the volume of gases obtained from the steel. Doctor Gillett made the suggestion that manufacturers of steel of high quality should put caps on their furnaces and use some form of vacuum pump to pull off the carbon dioxide and other gases as they are formed.

It was pointed out by J. M. Gaines, Jr., that the diffusion of gas through steel is very slow after the steel is melted. By holding a heat for one-half hour or so (other conditions being favorable) proper diffusion is obtained, so that analysis of one portion of the steel will check with that of another.

Tangible losses in open-hearth yields were contrasted with intangible losses by C. L. Kinney, Jr., superintendent open-hearth department, Illinois Steel Co., South Chicago. The intangible losses were referred to as those incurred in what goes into the slag pockets and what is taken out of the furnace with the outgoing gases.

An interesting case was brought up by George P. Hansen, general superintendent of operations American Rolling Mill Co., Ashland, Ky., as to the effect upon the labor costs in chipping steel, of running a blast furnace too fast. When the furnace, which was the only one supplying the open-hearth department at the time, was being driven, the average was running at about 9 man-hours for each ton of steel. It was decided to run the blast furnace more easily and the driving effort was stopped. Following this the chipping costs went down to as low as 0.7 man-hour to the ton.

Dr. C. H. Herty, Jr., pointed out in this connection that the pig iron quality is only one factor affecting the chipping costs. Others occurring in the open-hearth department and beyond it include the slags, pouring of the ingots, condition of the molds, heating in the soaking pits, etc.

On Monday afternoon there was a general session devoted to several interesting papers on complicated steel problems having to do with certain transformations in pure irons, with temper brittleness, and an interesting paper on metallic electrodes for cast iron welding.

Howe Memorial Lecture

Following this session the annual Henry M. Howe Memorial Lecture was delivered by John Howe Hall, chief metallurgist Taylor-Wharton Steel & Iron Co., High Bridge, N. J., and a relative of Doctor Howe. He took

as his topic, "Studies of Hadfield's Manganese Steel With the High Power Microscope." This lecture and the papers for the afternoon session referred to, as well as the papers delivered at the blast furnace session, Wednesday morning, Feb. 20, and the two steel sessions, Wednesday afternoon, will be reviewed in our general account of the convention in THE IRON AGE, Feb. 28.

Trade Practice Conference for Concrete Bar Industry

The Federal Trade Commission will hold a trade practice conference with members of the Concrete Reinforcing Steel Institute April 18, at Kenilworth Inn, Asheville, N. C., following the adjournment of the institute's annual meeting. Judge Edgar A. McCullough, chairman of the commission, will preside.

The conference was arranged at the request of the board of directors of the institute. An announcement sent out by the institute points out that rules adopted under the auspices of the commission have the backing of the authority of that body. Rules, it was stated, can be adopted that will not only cover illegal trade practices, but will also eliminate business practices that in themselves are not illegal, but are detrimental to the industry and responsible, in many cases, for unstabilized conditions.

Foundry Congress Has Large Enrollment

Registration for the third annual foundry conference held at Madison, Wis., under the auspices of the Department of Mining and Metallurgy of the University of Wisconsin, Feb. 5 to 8, was twice the enrollment for last year, according to Prof. R. S. McCaffrey who was in charge of the conference. These annual conferences are designed to provide foundrymen an opportunity to pursue short courses and instructions which cover fundamental principles and practices of the foundry. A feature of this year's course was a session on apprenticeship in the foundry industry.

Fabricated Steel Orders at 69 Per Cent in January

WASHINGTON, Feb. 19.—Orders for fabricated structural steel in January totaled 205,659 tons, according to reports received by the Department of Commerce from 204 plants with monthly capacity of 300,255 tons, bookings having been at the rate of 69 per cent of capacity.

Orders in December amounted to 201,852 tons, or 64 per cent of capacity. Computed orders in January totaled 246,400 tons, equal to computed bookings in December. Computed shipments in January were 273,350 tons, or 71 per cent of capacity, which was also identical with computed December shipments.

Improvement in European Steel Markets

Restricted Output in Britain Fosters Demand—Strong Prices on Continent—Cartel Matters to the Fore

(By Cable)

LONDON, ENGLAND, Feb. 18.

VERY little pig iron is being offered and occasional premiums are obtainable for prompt deliveries. Several furnaces are ready to blow in on short notice. Output is slightly improved and demand is broadening.

Less foreign steel is being offered, partly because of severe weather conditions on the Continent, where rivers and canals are frozen, affecting transportation. The German Semi-Finished Steel Syndicate has withdrawn all quotations.

British output is increasing and prospects are improving although severe weather here also is restricting activity. Supplies of scrap are scarce and steel makers are seeking limitation of scrap exports.

Export demand for finished material has improved, especially with the colonies, and mills are expecting good business with Canada as a result of the recent visit there of two British representatives. Fair sized orders are reported to have been secured already and more tonnage is to come, but no details have been disclosed.

January exports of pig iron totaled 40,421 gross tons, of which the United States received 4500 tons. Total exports of iron and steel were 421,000 tons.

Fuel prices are strong and coal output is insufficient, so that some pits are resuming operation where labor is obtainable. Meanwhile de-

mand is rapidly reducing supplies, especially on the Northeast Coast.

Sir W. G. Armstrong, Whitworth & Co. have secured an order for 46 large locomotive boilers for the Indian railroads. The Burma Railways has bought eight meter-gage locomotives from the Friedrich Krupp A. G. and the Indian State Railways has awarded 57 locomotive boilers to Henschel of Cassel.

Henry Boot & Sons, Sheffield, have signed a contract with the Greek Government in a vast land reclamation and irrigation plan involving about £10,000,000, which will include large expenditures to contractors and excavators. The South African Iron & Steel Corporation is considering British equipment for its Pretoria works to have a rated capacity of 150,000 tons of rolled steel, including rails, beams and wire rods.

A number of light castings makers are amalgamating, including the Sinclair Iron Co., Ketley, Abbots Foundry Co., Falkirk, R. W. Crosthwaite, Ltd., Thornaby-on-Tees, Falkirk Iron Co., Falkirk, Forth & Clyde & Sunnyside Iron Co.'s, Falkirk, Callendar Iron Co., Falkirk, and James Clay, Wellington. The combined companies will have a capital of £3,000,000 and are expected to take in other foundries and be known as Associated Foundries.

Welsh steel makers have increased prices on tin plate bars 2s. 6d. (60c.) per ton, because of more expensive fuel and scrap. Tin plate demand is improving, but business is still irregular. Galvanized sheets are moderately active and many mills are sold out to April. Black sheets are quiet, Japan showing no interest in the light gages.

British Iron and Steel Trade Improving

Shipbuilding and Railroad Construction Bring New Business—Pig Iron Output Still Restricted

LONDON, ENGLAND, Feb. 1.—Conditions in the iron and steel industry have improved since the beginning of the year, but are not entirely satisfactory. The temporary elimination of competition from Continental producers as a result of high prices has benefited some branches of the steel industry, and the volume of new ship-

building awarded since early last fall has brought considerable tonnage to the heavy steel mills.

Mills producing semi-finished products and light finished material are moderately well engaged, but there is some question whether present prices are sufficiently high to provide much profit. Tonnage from shipbuilders is

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd....	£0 18s.		\$4.37	
Bilbao Rubio ore*.....	1 2	to £1 2½s.	5.34	to \$5.46
Cleveland No. 1 foundry	3 9½		16.85	
Cleveland No. 3 foundry	3 7		16.25	
Cleveland No. 4 foundry	3 6		16.00	
Cleveland No. 4 forge..	3 5½		15.88	
Cleveland basic (nom.)	3 5		15.76	
East Coast mixed.....	3 12		17.46	
East Coast hematite....	3 12½		17.58	
Rails, 60 lb. and up....	7 15	to 8 5	37.59	to 40.01
Billets.....	6 5	to 6 15	30.31	to 32.73
Ferromanganese.....	13 15		66.69	
Ferromanganese (export).....	14 0		67.90	
Sheet and tin plate bars, Welsh.....	6 2½		29.70	
Tin plate, base box....	0 18	to 0 18½	4.37	to 4.43
Black sheets, Japanese specifications.....	13 7½		64.87	
Ship plates.....	7 12½	to 8 2½	1.66	to 1.76
Boiler plates.....	9 0	to 10 10	1.95	to 2.27
Tees.....	8 2½	to 8 12½	1.76	to 1.86
Channels.....	7 7½	to 7 17½	1.60	to 1.71
Beams.....	7 2½	to 7 12½	1.55	to 1.65
Round bars, ¾ to 3 in.	7 15	to 8 5	1.67	to 1.78
Steel hoops.....	9 0	to 10 0	1.95	to 2.16
Black sheets, 24 gage..	10 0		2.16	
Galv. sheets, 24 gage..	13 12½	to 13 15	2.95	to 2.98
Cold rolled steel strip, 20 gage (nom.).....	12 0		2.64	

*Ex-ship, Tees, nominal.
(a) Nominal.

Continental Prices All F.O.B. Channel Ports (Per Metric Ton)

Foundry pig iron (a):				
Belgium.....	£3 6s.	to £3 10s.	\$16.00	to \$16.97
France.....	3 6	to 3 10	16.00	to 16.97
Luxemburg.....	3 6	to 3 10	16.00	to 16.97
Basic pig iron (a):				
Belgium.....	3 6		16.00	
France.....	3 6		16.00	
Luxemburg.....	3 6		16.00	
Coke.....	0 18		4.37	
Billets:				
Belgium.....	5 5		25.46	
France.....	5 5		25.46	
Merchant bars:				
Belgium.....	6 3½	to 6 4	1.35	to 1.36
France.....	6 3½	to 6 4	1.35	to 1.36
Luxemburg.....	6 3½	to 6 4	1.35	to 1.36
Joists (beams):				
Belgium.....	5 3½	to 5 5	1.14	to 1.16
France.....	5 3½	to 5 5	1.14	to 1.16
Luxemburg.....	5 3½	to 5 5	1.14	to 1.16
Angles:				
Belgium.....	6 2½		1.33	
½-in. plate:				
Belgium (a).....	6 11½	to 6 12	1.44	to 1.45
Germany (a).....	6 11½	to 6 12	1.44	to 1.45
¾-in. ship plate:				
Belgium.....	6 6	to 6 7	1.38	to 1.39
Luxemburg.....	6 6	to 6 7	1.38	to 1.39
Sheets, heavy:				
Belgium.....	6 1		1.31	
Germany.....	6 1		1.31	

slow in developing, but in view of shipbuilding contracts actually placed, the mills rolling heavy plates and shapes should have a substantial volume of business for several months. In addition to shipbuilding, the railroads have extensive plans for new construction and replacements, and building construction throughout the country is active.

Export business, except in tin plate and black and galvanized sheets, is still quiet, although inquiry has improved. Most of the export business in heavy steel products is from the colonial governments or for shipment to fabricating plants in the colonies, where considerable bridge construction is in progress.

Demand for pig iron is better, and producers, especially in the Cleveland district, are well booked. Output

continues restricted and the price is controlled by agreement among the furnaces. There is heavy demand for pig iron from steel works, so that but little tonnage is available for sale in the open market. While this situation could be changed by blowing in some of the idle furnaces, producers apparently regard such a step as unwarranted and consumers are forced to satisfy their pig iron requirements from other districts.

Tin plate continues inactive, but mills are well engaged and the minimum price is unchanged, with restriction of output renewed for a further period of 13 weeks from Feb. 22. The policy of curbing production has enabled producers to dispose of the greater part of their output despite the continuance of poor current demand.

from 0.70 m. to 1.25 m. (17c. to 30c.) per ton, depending upon the proportion exported and sold domestically each month. It is believed by the association that the plan will greatly stimulate exports of wire nails.

Rail Cartel Faces Demand for Increased Quotas

HAMBURG, GERMANY, Feb. 2.—The European Rail Makers' Association is experiencing internal troubles. In addition to the continued refusal of British members to pay the full penalty of 5s. (\$1.21) per ton for excess production in 1928, which would amount to about £40,000 (\$194,000), Poland has refused to join the cartel. At the same time the Central European group in the cartel, which includes Austria, Czechoslovakia and Hungary, has reported that its annual allotment of 45,000 tons is inadequate, because of competition from Poland, and has demanded an addition of 25,000 tons a year.

German members of the association insist that orders executed by them to reparations account, amounting to about 65,000 tons in 1928, should not be included in quota tonnage, and Saar and Luxemburg mills are demanding increases in their allotments.

Association of Continental Tin Plate Mills Proposed

HAMBURG, GERMANY, Feb. 2.—A Continental Association of Tin Plate Manufacturers may be formed to promote the development of export trade. While the total production of European mills is small, it is estimated that 4500 to 5000 tons of tin plate is exported each month, Germany contributing about 3000 tons, France about 800 tons and other Europeans mills about 750 tons. The association, it is believed, would be most effective in expanding export markets in Norway, Sweden, Spain and Portugal. Another purpose of the association would be to establish uniform standards of quality in the various member countries.

German Non-Ferrous Metal Output Increasing

HAMBURG, GERMANY, Feb. 2.—German production of spelter in 1928 totaled 98,256 metric tons, compared with 84,062 tons in 1927. This increase occurred in spite of efforts by the zinc cartel to enforce a 7 per cent restriction on output for the year. The restriction was later increased to 10 per cent, but output continues to expand in Germany, Belgium and Poland. German production of lead reached a total last year of 104,839 metric tons, compared with 96,075 tons the year previous, and copper output showed a 13 per cent increase over 1927, with a total last year of 151,359 tons.

Belgian Iron and Steel Prices Strong

Buyers of Semi-Finished Steel Offer Premiums for Prompt Delivery—Pig Iron Advance Expected

ANTWERP, BELGIUM, Feb. 2.—Prices are firm, and most mills are well booked with orders and are not seeking further business. Belgian railroads have placed substantial contracts, and general domestic activity is good, with sizable tonnages being shipped for export. German domestic business is reported better than had been expected, and French mills are fully booked with tonnage for early delivery.

Exporters are placing some desirable orders with the mills, and only occasional concessions in price are reported on normal beam specifications. Only a few bar mills are in the market for tonnage and in most cases are willing to accept only certain sizes, so that it is sometimes necessary to place a single order with two or three makers. While the quotation for steel bars is £6 4s. 6d. per ton (1.36c. per lb.) f.o.b. Antwerp, £6 5s. per ton (1.37c. per lb.), Antwerp, is asked for small lots or a wide range of sizes. Prices on beams are not so firm as on other products, as certain mills are still seeking tonnage. Concessions on beams, however, do not exceed 6d. (12c.) per ton; the ruling market ranges from £5 1s. 6d. to £5 4s. per ton (1.11c. to 1.14c. per lb.), f.o.b. Antwerp. Hot-rolled hoops are firm at £6 5s. per ton (1.37c. per lb.), and corrugated steel bars are quoted at £6 10s. per ton (1.43c. per lb.), f.o.b. Antwerp. The sheet market shows some irregularity, with heavy sheet prices firm, medium gages occasionally shaded and thin-gage sheets still encountering considerable competition from the British product. Black sheets of Thomas quality, 1/16 in. thick, are quoted at £6 15s. per ton (1.48c. per lb.), f.o.b. Antwerp.

The market on semi-finished steel is strong, with little material available, and with buyers still offering premiums for delivery. Billets are firm at £5 to £5 2s. 6d. (\$24.25 to \$24.85) per

ton, and blooms are practically unobtainable except by consumers who have contracts. Demand for sheet bars is also heavy, and the minimum price today is about £5 3s. 6d. (\$25.08) per ton.

Establishment of a Brussels office has been decided upon by the pig iron syndicate. No announcement of new pig iron prices has been made as yet, but, in view of the recent advance in French quotations, it is believed that the new schedule will be considerably increased, as demand continues active and stocks on hand are small. The small tonnages of foundry iron available for export are bringing about £3 8s. (\$16.49) per ton. Prices on Bessemer hematite iron are still based on competition from the British product, with most furnaces quoting £3 16s. to £3 17s. (\$18.42 to \$18.66) per ton, f.o.b. Antwerp.

German Wire Syndicate Plans Export Bounty

HAMBURG, GERMANY, Jan. 19.—With a view to increasing exports of wire nails, the German Wire Makers' Syndicate is planning to establish an export bounty on nails. The German price for wire nails is usually 2s. 6d. to 5s. (60c. to \$1.21) higher than Belgian or French quotations, but despite this difference, substantial quantities of nails are shipped abroad by German mills; in the fourth quarter of last year about 7000 tons a month was exported.

The bounty plan of the German wire nail makers provides that 3 m. (71c.) per ton shall be paid by the association on all exports of its members, 50 per cent of this bounty coming from the wire rod manufacturers and the other 50 per cent from a special tax levied by the association on all deliveries by its members to domestic consumers. This tax would vary

Wire Rod Cartel Fixes Delivered Prices

HAMBURG, GERMANY, Feb. 2.—The International Wire Rod Cartel has published a list of c.i.f. quotations on wire rods. On deliveries to Japan prices are £7 18s. 6d. (\$38.43) per ton, c.i.f. Yokohama or Kobe, £8 1s. (\$39.04) per ton, delivered to Osaka, and an additional 2s. 6d. (60c.) at other Japanese ports. For China, quotations are £7 18s. 9d. (\$38.49) per ton, c.i.f. Hong Kong, and £8 1s. (\$39.04) per ton, c.i.f. Shanghai. Terms of payment are net cash against shipping documents. Standard extras have been fixed for special quality wire rods, with square rods taking an extra of 5s. (\$1.21) per ton, open-hearth material an extra of 8s. (\$1.94) per ton and special quality open-hearth rods 15s. (\$3.63) per ton.

German Exports in Excess of Cartel Quota

HAMBURG, GERMANY, Feb. 2.—Present export sales by the German steel industry are considerably in excess of the allotment of 300,000 tons a month fixed by the International Steel Cartel. The export quota represents 32 per cent of total German production, but some mills are now exporting as much as 60 per cent of their output. In view of the cartel meeting in March, at which German mills will demand a higher quota, it is noteworthy that the United Steel Works, Düsseldorf, has published a report from which it is apparent that during January the company sold about 50 per cent of its total production for export.

Laclede Steel Co. to Build 100-Ton Open-Hearth

The Laclede Steel Co., St. Louis, has prepared plans for a 100-ton open-hearth furnace to be built at its East St. Louis, Ill., plant which will increase its capacity to four furnaces.

Carnegie Abandons Plant at Bellaire, Ohio

The Carnegie Steel Co. has abandoned its Bellaire, Ohio, plant, which long has been idle and dismantling work has started. Announcement of this step occasions little surprise as no money has been spent on the plant for a long time and its ultimate abandonment has been expected for some time.

The plant had two blast furnaces, the first built in 1873 and rebuilt in 1915, and the second built in 1894 and remodeled in 1917. They had an annual capacity of 276,000 tons of Bessemer iron. The steel works, built in 1883-84 and rebuilt in 1897, comprised two 10-ton Bessemer converters, three cupolas, a 250-ton mixer and five one-hole soaking pits.

Rolling mills consisted of a 32-in. two-high single stand blooming mill and 24-in. three-high, two stand and 24-in. two-high single stand sheet bar mill. Annual production was 420,000 gross tons of ingots, partly copper bearing, and 364,000 gross tons of sheet and tin bars. A foundry produced annually 1500 tons of iron and 50 tons of brass castings for use in the plant.

New Britain and Gridley Tool Companies to Merge

The board of directors of the New Britain Machine Co., New Britain, Conn., will recommend to the stockholders at the annual meeting March 8, that the machine tool business of the company be separated from its other activities and consolidated with the machine tool business of the Gridley Machine Co. of Hartford. The combined machine tool companies will probably be known as the New Britain-Gridley Machine Co. The new corporation will be a subsidiary of the New Britain Machine Co.

In a letter to stockholders, H. H. Pease, president New Britain Machine Co., says:

"The Gridley Machine Co. has, in its two years of existence, successfully developed a single-spindle chucking machine and multiple-spindle chucking machine of unusual merit. The engineering staff of the Gridley Machine Co. is made up of men of long experience in the field of automatic screw machines. G. O. Gridley was at one time president of the Windsor Machine Co., and several thousand automatic screw machines bearing his name were built by that company and are now in use. His name, as a designer of screw machines, is most widely and favorably known. Mr. Montgomery and Mr. Wheeler who, as well as Mr. Gridley, will be connected with the company, have had experience of a great many years in this field, and have demonstrated that they will be very valuable additions to the very capable engineering and designing organization headed by Robert S. Brown, that has made possible the success of the New Britain designs."

Standards for Woven Wire Fencing

Simplified practice recommendations for woven wire fencing have been put out by the Department of Commerce in a pamphlet that may be obtained at 5c. from the Superintendent of Documents, Government Printing Office, Washington. The reduction in sizes and styles has been approximately 90 per cent. There are now 62 fencing styles recognized, in place of the original 552, and 117 sizes of packages for woven wire fence, against the 2072 before simplification was attempted. Details of the present sizes and characteristics are shown in the pamphlet.

Coming Meetings of British Iron and Steel Institute

The annual meeting of the Iron and Steel Institute (British) will be held May 2 and 3 at the House of the Institution of Civil Engineers, London, England. Prof. Henry Louis will assume office as president at that meeting.

The autumn meeting will be held Sept. 10 to 12 at Newcastle-on-Tyne, England, by invitation of the Lord Mayor and the corporation of that city.

It is definitely announced that the autumn meeting in 1932 will be held in the United States, in response to an invitation from the American Institute of Mining and Metallurgical Engineers, and the American Iron and Steel Institute, presented for them by Charles M. Schwab, president of the latter, at the annual general meeting in May, 1928, when the Bessemer medal was bestowed upon him.

Bethlehem Opens Warehouse at Houston, Tex.

The Bethlehem Steel Co. has established a storage warehouse on the ship channel at the port of Houston, Tex., where a complete stock of line pipe is carried in sizes from 2 to 10 in. R. D. Oberwetter, formerly vice-president and general manager of the Reading Iron Co. of Texas, has been engaged to supervise the sale of this pipe, and he is located at 1807 Post-Dispatch Building, Houston.

The pipe is transported by barge direct from the Bethlehem docks at Sparrow's Point, Md., to docks of the Manchester Terminal Corporation at Houston. During the last two months the plant has been in operation three boat cargoes have been shipped into this stock. The Houston office is a sub-office of the St. Louis office of the Bethlehem company, 1824 Arcade Building, of which William Chapman is manager.

Harnischfeger Employees Hold Banquet

Of more than 700 employees who attended the annual banquet of the P. & H. Old Timers' Club of the Harnischfeger Corporation, Milwaukee, manufacturer of electric traveling cranes, 563 had been in the service of the company continuously for five years or longer. Herman Haehle, president of the club, has a record of 37 years. The records show that 335 employees have been in the service five years or more; 120 ten or more years' service; 36 for 15 yr., 24 for 20 yr., 29 for 25 yr., eight for 30, and two for 35 yr. or more.

Marquette Iron & Steel Co., E. M. McGary president, has recently started operation of a mine and blast furnace at Brandsville, Mo., and is producing daily 100 tons of charcoal pig iron and 50 tons of ferromanganese.

This Issue in Brief

Dross in galvanizing will be reduced if large pickling tanks are used. Small tanks (300 gal.) become almost saturated with iron in about four days, while large tanks show only relatively small percentage of iron at the end of a week's operation.—Page 538.

* * *

Purchase orders are made directly from production department's material record form. Separate requisition on purchasing department is thus eliminated. When purchase order is issued, number is entered on the form, and it is returned to the production department.—Page 531.

* * *

Circulation of price and statistical information by trade associations, in a form to identify results for individual members, may be declared illegal, says Federal Trade Commission.—Page 550.

* * *

Difficult molds should be inspected by superintendent at predetermined stages. These stages should be decided upon when the order for the casting is issued, and should be noted on inspection card given to foreman or molder.—Page 533.

* * *

Production statistics are available in abundance, but what are needed are statistics on spending power. Volume of trade is determined not by needs or wants but by ability to buy.—Page 558.

* * *

Which alloy steel shall I choose? With many alloys available for a given part, the buyer should select the one which will give him the lowest cost per finished part. This means that he must take into consideration not only his own manufacturing operations but the limitations of his manufacturing personnel and equipment.—Page 559.

Turndown in business is approaching, manufacturing economist believes. The turning point will come in 1929, A. T. Simonds believes, and will probably occur before the fall.—Page 552.

* * *

Trade association licensing will probably not become a law. If Federal Trade Association's proposal were adopted as proposed, it would subject all association records to periodic inspection by Government.—Page 550.

* * *

Increase foundry profits by sand control. Bond strength and permeability tests can be quickly and easily made, says sand consultant. Grain fineness and clay determinations are highly valuable for controlling shipments of new sand and bonding alloys.—Page 535.

* * *

Welded joints in power plant piping are as strong as the pipe itself if properly made, tests reveal. Butt welds should be reinforced 25 per cent.—Page 541.

* * *

Machinery manufacturers in diverse lines plan to federate. Believe that organization will be better able to secure needed consideration of tariff revisions and greater help from Department of Commerce, as well as to promote adoption of trade practice agreements.—Page 545.

* * *

Good quality pig iron produced by wide-hearth blast furnaces. Furnaces with 22 ft. or more hearth diameter are also satisfactory in smoothness of operation and economy. One furnace in United States averaged more than 1000 tons of iron a day during 1928.—Page 549.

Ingot molds will last longer if size of graphite flakes is reduced. Large flakes offer decreased resistance to intercellular cracks, thermal fatigue and oxidation of the mold metal, engineer declares. Investigation points to need for addition of chromium to the mold metal or to other changes in chemical composition or thermal treatment of the mold.—Page 539.

* * *

Manufacturing budget controls stocks and purchases. Successful manufacturing budget control system is based primarily on 90-day estimated shipping schedule, which in turn is based on sales forecast and orders on hand.—Page 527.

* * *

Superintendent can save time by requiring that he be called to inspect important work at stated stages, rather than superintending the work in a general or haphazard manner. Periodic inspection plan insures that delicate jobs will have the superintendent's expert attention when it is most needed.—Page 535.

* * *

"Aircraft grade" of chrome-molybdenum steel is adopted for Government aircraft. Army-Navy Standards Conference decides to label approved specifications "AN." Definite purchase specifications have been adopted for spring steel, soft galvanized steel wire, sheet steel and mild carbon steel billets.—Page 561.

* * *

Questionable trade association activities disguised by use of special "lingo," says Federal Trade Commission report. Some trade association executives and members are proficient in the use of guarded language, particularly concerning price discussions.—Page 551.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

The Supply of Executives

NO less than 55 consolidations were listed in the Jan. 3 issue of *THE IRON AGE* as having been formed in the metal-working industry in 1928. Seven of them were made by producers of iron and steel, but the great majority represents the bringing together of two or more founders, fabricators, builders of machine tools, equipment manufacturers and the like.

As 1928 was not exceptional in respect to such mergers, it is readily appreciated that since the World War this movement has worked decided changes in the industrial field represented by this journal. In each case a number of executives withdrew from active business. The desire to retire was no doubt a consideration with some of them, while with others, not a few, the reason was the incoming of a new personnel and often of new policies, and naturally a consolidation management meant fewer executives.

The ease with which such consolidations are brought about raises the question whether industrial executives of the higher caliber presumably demanded by these large corporations are being developed in relatively greater numbers than formerly. There is no doubt of the broadening experience through which thousands of our manufacturers have passed in the thirty years following the depression of 1893-98. With the end of that depression came the beginning of the consolidation era that has vastly changed methods of production, distribution, financing and purchasing in so many of our industries.

Even more exacting and broadening were the demands of war time and the decade since the Armistice. Many heads of industrial corporations found in this period that, while they had long conducted their businesses as individual enterprises, the time had come when their plans must take account of group movements and group policies. Group market research, standardization, simplification, codes of practice, and the cooperative gathering and distribution of trade information have modified in many respects the old order of things.

So far have these new influences reached, that perhaps we should change the question raised above as to the supply of high-grade executives and ask instead whether, as business is now conducted, success depends as much as formerly on having the leadership of an outstanding personality.

Consumers, the Government, competitors and employees have been more influential in the past decade in determining the lines of conduct for industry. Following the cooperative effort of war time, manu-

facturing executives have found the area for the exercise of individual choice less extensive than before. Committee control in the individual corporation and group action in the particular industry have succeeded the period of rule by a dominating personality. Thus in the steel industry a Carnegie would be as much of an anachronism today as a Harriman in transportation.

Nothing said above implies that the requirements of industry as organized today are less exacting than under the former régime. The new conditions do call for a different type of executive—especially one who grasps the meaning of the group influences that have grown so rapidly in the past decade and a half. To use the analogy of government: since kings have given way to constitutions, men of high caliber have developed in ample numbers for the service of the State. In like manner the supply of high-grade business statesmen is proving fully adequate to the demands of the new industrial régime in which generally accepted policies are in no small degree replacing individual leadership.

Spending Power vs. "Needs"

ONE of the revolutions in business which have come since the war involves replacement of the old conception of "needs" by the new conception of buying ability as the principal indicator of the probable volume of trade. The new philosophy is so well grounded and so generally accepted that its newness may be forgotten, and therein lies much chance of misconception. In judging the future we must use the past, but we must carefully reckon how much of the past is applicable. Alleged "lessons" from the past are misleading if allowance is not made for changed conditions. Changes occur in the way men look at things, in their philosophy, and that is just as much a condition as material things are.

This new philosophy dates from a time somewhat after the ending of the war. J. M. Keynes's "Economic Consequences of the Peace," published in 1919, pointing out the dislocations and in effect declaring that ability to transact business, not needs or wants, would be the governing influence, was widely criticized. In the hectic times of 1920 there probably were some men who grasped the new theory of buying power, but they were kept silent by the spirit of the times, which was that if you had goods the only limit to the price you could exact was the price at which your prospect could buy elsewhere. Then came the disillusionment, and gradually the view became prevalent that buying power rather than needs or wants is

the fundamental factor in determining the volume of trade.

It is largely due to the practice of the new philosophy that we have had the steady trade of the last few years that has been the wonder and the despair of the business cyclists. Before the war there were recurrent spells of construction, providing useful facilities in excess not of the wants but of the ability of consumers to patronize them. After a depression the people would emerge with a higher standard of living than ever before, having developed the necessary buying power.

We pride ourselves upon the vast increase there has been in statistical information about trade, but it is perfectly obvious that the bulk of it is lopsided, in view of this changed philosophy of buying, for its chief relation is to the producer, not to the consumer. There are many sets of statistical data which show production and compute the percentage relation to the productive capacity. What is sold is bought; but where are the statistics showing the percentage relation of the purchases to the buying power of the purchasers?

We are not only lacking in adequate statistics of employment but we are supplied with employment statistics which, if not misleading in themselves, are likely to be misinterpreted. The "selected industries" about which we have statistics are necessarily old industries and the big thing today is the new industries, which are not measured. Again, the need of statistics of total national income is well recognized, but despite the work that has been done the presentations leave a great deal to be desired. We need much more information about buying power than we have.

Important New Copper Mines

LAST year witnessed the development of two very great copper mines, or rather one great mine and another group of mines. Our use of the term development requires perhaps some explanation. Development in the sense of the mining engineer is yet to come. Discovery on the other hand was several years preceding. What really happened during 1928 was the awakening of appreciation that these were in fact very great mines; mines that were to be classed as major in the biggest sense.

We refer to the Froid mine of the Sudbury district of Ontario and the group of mines in Northern Rhodesia. The Froid mine was a new discovery in an old district and was on property owned by the International Nickel Co. and the Mond Nickel Co., which have recently consolidated. It is believed to have something like 125,000,000 tons of ore of a metallic content (copper and nickel) that is unprecedented.

The Rhodesian mines are several. B'wana M'Kubwa, N'Changa, Rhodesian Selection Trust and Roan Antelope. Perhaps others. They have occurrences of ore, 4 per cent copper or so, in beds of great thickness that are capable of being tested by boring. It may be that these will prove collectively to be the greatest occurrence of copper ever found in the world in one region. It is not fantastic to imagine that Roan Antelope may prove to be the world's biggest copper mine.

Anyway there is a new industrial development immediately ahead of us that is analogous to that of our own porphyry mines 20 years ago. There will be the difference that then our engineers were testing a new idea and their demands for ten million dollars for the equipment of a single property were rather staggering and more or less troublesome to financiers who had to raise the money from a skeptical public. Owing to that, however, the public received unusually good terms, and as the ideas of the engineers proved brilliantly successful, the courageous investors realized great fortunes, such as were never realized before in the mining history of this country.

With that rosy experience in the background, the investing public is now eager to follow the engineers; and estimates of twenty-five million dollars for the development and equipment of a mine are accepted as something in respect to which there need be no hesitation. At the moment it is easy to raise such great sums of money by selling stock, and such expedients as convertible bonds that used to be offered as bait are unnecessary. The new stockholders moreover are quite content to wait for the series of years before production and dividends can begin.

It is noteworthy that these new mines are in the British empire. The Sudbury mines heretofore have been owned largely by an American company, but control has lately passed by purchase and consolidation to Canada and Great Britain. On the other hand Americans have become largely interested in the Rhodesian mines. In respect to the last some British jealousy has been exhibited.

Mines are a great source of national wealth. Spain became rich out of its acquisitions in Mexico and Peru. More recently the copper mines of Katanga have been the great jewel in the economic crown of Belgium. There is no need for envy, but rather of rejoicing, that Great Britain has now found something that will be profitable to it and will help toward recouping the great losses of the war. Great Britain will need, however, American experience and management, and its best minds recognize the American genius for operating copper mines. The British will properly want to retain the major interest in their new mines but they will also want to have an American partnership, which will be to mutual advantage.

Selecting the Right Alloy Steel

THIRTY years ago the manufacturer of machinery was often puzzled to decide what steel to buy for tools or for parts requiring a little extra quality. His successor today is in the same quandary, only worse. Then plain carbon steels were the only ones generally available; the purchaser had the choice of a range of "tempers" (as was the quaint expression for carbon content) and had been taught that crucible steel is much superior to Bessemer or open-hearth. Even though he was plagued by ardent salesmen arguing the advantages of "King Double Bar" brand over the "Bull Minor" label he had been using for years, the choice was actually restricted to the possible permutations and combinations of carbon content and steel making practice.

Bad enough, but how much more complex it is now! To the plain carbon steels have been added

alloying elements; furthermore open-hearth, crucible and electric furnaces are competing for the fine steel market. Seven hundred brands of tool steel are on sale; to iron and carbon have been added tungsten and chromium, then vanadium, and molybdenum, and cobalt in greater and greater amount until at last iron has been completely crowded out.

And in alloy steels for machine parts—suppose a man wants to make ten thousand clash gears or wrist pins. Shall he use the old-fashioned plain carbon steel, or shall it have an extra amount of manganese, or 1 or 2 per cent of nickel or chromium, or alloyed with combinations of several? If he mentioned the fact that he was open to conviction, he would probably be "sold" on every one of these, and the selling argument would be bolstered up by citations where the favorite analysis had been successfully used in just such an application as he contemplates.

Nor would the salesman be drawing upon his imagination. Consider big bridges—we have used cold-drawn high-carbon steel, heat-treated medium-carbon steel, normalized nickel steel, nickel-chromium, manganese, high-manganese low-silicon, low-manganese high-silicon and heat-treated nickel-chromium steel. High-strength steel castings with manganese, vanadium, nickel and nickel-chromium, after various heat treatments, are being placed into equivalent services.

During the war, we tried for light armor nickel steel, nickel-molybdenum, nickel-chromium, nickel-silicon and chromium-vanadium steels and they all withstood the ballistic tests. Heavy-duty springs we have made of high-carbon, silico-manganese, manganese without the silicon, and chromium-vanadium steels. Locomotive axles and forgings range from wrought iron through normalized carbon and vanadium steel up to quenched and tempered nickel steel, by way of nickel-chromium and chromium-vanadium. High-pressure boilers and drums are of carbon steel, nickel steel, high-manganese low-silicon and nickel-chromium steels.

Is one to conclude from this none-too-inclusive list that the group of low alloys sometimes called "structural alloy steels" are interchangeable? That if merely a combination of toughness and strength is required beyond that readily procured in carbon steel, any of the low alloys when intelligently made and heat treated will serve? That only in the most extreme conditions of service, or those requiring unusual combinations of physical, chemical and electrical properties, is it necessary to select the alloys with discrimination?

If such are fair conclusions, and we believe that they would be correct principles for most manufacturers to act upon, then the problem resolves itself into one of cost—not alone the cost per pound of the steel, f.o.b. plant, but including the cost of the various other operations, forging, pressing, cleaning, machining, heat-treating, riveting, welding and finishing. In these items alone there is ample room for the exercise of managerial and metallurgical skill. In fact, it should be a matter of congratulation that several alloys are available for a given part or duty, as far as the strength, toughness and fatigue resistance are concerned.

One of the steels might be most economical to use

where the part is to be drop-forged and a free-scaling surface is very desirable. Another would be the choice if warping during final heat treatment were to be avoided. Still another might be favored if rapid and extensive machining were necessary. Another might be unsuitable because the heat treatment department may not be equipped to handle it. Or all these considerations might properly be subordinated to a record of long and satisfactory business relationships with a steel maker capable of delivering prompt supplies of uniform metal.

Thus it is impossible to generalize and say that a certain S. A. E. steel is best for making an axle, because each manufacturer has individual problems in his production and he must select the type of steel to fit his men, machines and general equipment, as well as his market. In doing this he exercises that executive ability which enables him to choose the proper machine tool or a good foreman, and which determines his business success generally. Steel salesmen, in turn, would do well, we believe, to put more emphasis on such advantages as their favorite alloy has in the production line of the customer, rather than on its physical properties as determined by the routine tests, for several other chemical analyses can match theirs in the latter category.

Automobile Trade Trends

A CONSENSUS of opinion has named 1929 as a crucial year for the automobile trade, one that will do much to show how the total demand will run in future and which of the many makers will be called upon to meet it. The year's or the half-year's demand is only part of the problem, for there are wide variations in automobile production during a year. In the last seven years the high and low months of each year have been in the following relations: 1922, 75 to 25; 1923, 62 to 38; 1924, 65 to 35; 1925, 64 to 36; 1926, 72 to 38; 1927, 76 to 24; 1928, 67 to 33. Furthermore, the high and low points do not fall in the same portion of the respective years. Monthly variation has been so incoherent that it is impossible to make up a schedule of seasonal changes.

In the longer run the variations have tended to smooth out, but the idea prevalent in some quarters that automobile production has alternated high and low in successive years is not correct. It would be, had not two high years, 1925 and 1926, come together, and that exception is sufficient to upset the hypothesis. The other high years in the last seven were 1923 and 1928. As a matter of fact, twelve-month periods through June do not, when plotted, make a distinctly more crooked line than plotting of calendar years. And there is the other curious point that plotting by half-years results in a curve less kinky than would be expected by reason of the shorter periods considered. There have been merely two big dips in the half-yearly curve—for the second half of 1924 and the second half of 1927.

That there has been only a slow rate of gain in automobile production in the last four years must now be accepted, for the statistics are clear. Monthly official statistics begin with July, 1921, and lately have been revised somewhat by the Department of Commerce and the Dominion Bureau of Statistics.

Passenger car and truck production, United States and Canada, has been as follows, first column by half-years, second column by calendar years, third column by years ended June 30:

Total Automobile Production			
	Half-Year	Year Through December	Year Through June
1922	1,191,200 1,455,029	2,646,229	2,067,883
1923	2,125,116 2,055,334	4,180,450	3,580,145
1924	2,103,132 1,634,654	3,737,786	4,158,466
1925	2,240,809 2,186,410	4,427,219	3,875,463
1926	2,481,967 2,023,900	4,505,867	4,668,377
1927	2,200,184 1,379,569	3,579,753	4,224,084
1928	2,326,522 2,273,244	4,599,766	3,706,091

One observes from the table that the calendar year just ended was only 10 per cent above the calendar year 1923, five years earlier, and was 1.5 per cent under the twelve-month period through June 30, 1926, two and one-half years earlier. The question is whether in the general swing the first half of last

year was abnormally low or the second half abnormally high. If one assumes the former, he may expect heavy production in the first half of this year without having assurance that the second half will be in line with it.

It is frequently argued that increasing exports will swell our production and offset a possible decrease in domestic demand. That argument ignores the fact that this influence has already been at work. Total exports of cars and trucks from the United States have been as follows:

1922.....	78,559	1926.....	305,528
1923.....	152,096	1927.....	384,313
1924.....	178,883	1928*.....	524,177
1925.....	303,059		

*December estimated equal to November.

The above figures cannot be precisely associated with the production figures in the preceding table, because Canadian production is there included, but our exports of complete vehicles to Canada are small, though in parts for assembly exports to Canada largely predominate. In a general way, however, it appears that last year's domestic demand was only equal to 1923 and ran under both 1925 and 1926.

Army-Navy Aeronautical Standards

Conference Adopts "Aircraft Grade" Chrome-Molybdenum Steel—Wire Shapes and Small Engine Parts Simplified

PHILADELPHIA, Feb. 16.—Attended by some 155 delegates during the four days' sessions, the fifth annual Army-Navy Standards Conference was opened by Commander Ralph D. Weyerbacher, at the naval aircraft factory, Philadelphia, on Feb. 11. Four groups on specifications, power plants, instruments and aircraft parts, respectively, held simultaneous sessions. The conference covered all phases of aeronautical activity, and considered approximately one hundred specifications and a like number of drawings and included many items about steel specifications and steel products. To distinguish the findings of this conference the approved specifications are labeled "AN."

With the growing use of chrome-molybdenum steel in welded aircraft construction, the need for a coordinated specification which would properly define aeronautical requirements and still conform to reasonable commercial practice has been apparent. Consequently specifications which define an "aircraft grade" of steel were adopted for chrome-molybdenum steel tubing, as well as rod, bar, sheet and strip.

The use of streamline shape tubing, in lieu of a round tube with wood fairing in exposed locations, has been

constantly growing. Unfortunately, due to the fact that aircraft manufacturers have expressed individual preference on the exact size and contour of such a shape, large stocks of dies have accumulated which are applicable only to a particular job. By the adoption of an "AN" specification for chrome-molybdenum streamline tubes, with a definitely standardized cross section, this situation will be corrected.

"AN" standard bolts and nuts for structural use are now made of SAE 2330 and SAE 1025 steels respectively. With the growing use of chrome-molybdenum steel as the standard steel for aeronautical use, it was agreed to conduct experimental work and service tests to determine if these standard bolts and nuts could be satisfactorily made and used of this latter steel.

Streamline wires are now usually made of SAE 1050 steel. It was decided to study the possibilities of some form of stainless steel for this purpose. This development will be carried on through cooperation between the manufacturers of streamline wires and the Army and Navy.

Definite purchase specifications were adopted for spring steel (SAE 1095), soft galvanized steel wire, sheet steel

(SAE 1025) and mild carbon steel billets.

The advisability of standardizing small parts of aeronautical engines, as is now done to the structures, was thoroughly discussed and agreed to. Such activity will undoubtedly lead to agreements on a particular steel for a particular small part, rather than the wide diversity which now exists.

Many steel products such as shear nuts, wing nuts, ball terminals, nails and iron rivets were fully standardized. Steel, as a component part of the many accessory units and fabricated assemblies simplified, naturally came in for much attention.

Philadelphia Steel Club Has Anniversary Dinner

The Steel Club of Philadelphia held its tenth anniversary dinner and entertainment at the Penn Athletic Club Friday evening, Feb. 15. The gathering was the largest the club has had at any of its dinners, totaling about 300. Willard S. Haring of the Alan Wood Co., president of the club, lauded the late William L. Hoffman, who was one of the founders of the club and a former president. Mr. Hoffman died on Feb. 1. Except for Mr. Haring's brief remarks, there was no speaking, the remainder of the evening having been taken up by an entertainment arranged by a committee headed by William Dixon of the Alan Wood Co.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows: Feb. 28—Activity in Steel Consuming Industries; March 21—Position of Iron and Steel Producers.

Iron and Steel Markets

Further Advances in Prices

Plates, Shapes and Bars Marked Up \$1 a Ton—Cold-Finished

Steel Bars Advanced \$2—Another Increase in Furnace

Coke—Higher Ore Price a Possibility

FRESH advances in steel prices bear testimony to the large volume of business passing through the mills.

Increases of \$1 a ton on bars, plates and shapes and \$2 a ton on cold-finished bars, more general adoption of a \$2 a ton advance on common finishes of sheets, a readjustment of cold-rolled strip extras and imminent upward revision of quotations on other products are features of the week.

While the new quotations will not undergo a serious test until buying for second quarter sets in, they are calculated to stimulate specifying against current contracts. A lag between the announcement of an advance and the time it goes into effect or fails is, of course, to be expected in a normal market situation. The raising of prices, therefore, cannot be interpreted as a maneuver to drive in shipping orders, but rather as a reflection of confidence among the mills, or possibly an effort to bolster up mill confidence.

A common complaint of late has been that market prices, in some sections of the country, have not been in consonance with the volume of business that mills have been booking. Irregularities have been due partly, no doubt, to wide variations in the demand for different commodities, as well as disparities in the rate of activity in different districts.

Another factor has been a growing hesitancy in business sentiment, which is commonly ascribed to recent developments in the money market and, by some observers, to the unfavorable earnings of many of the smaller manufacturing consumers of steel.

The advance in plates, shapes and bars, first announced by the Steel Corporation subsidiaries and later adopted by most independents, raises quotations to 1.95c. at Pittsburgh, and to proportionate levels at other basing points. The situation in these products illustrates the divergences previously noted. Bars have been strong in virtually all markets, and plates and shapes have been in active demand in the Chicago district. In the East, however, the latter two products, and particularly plates, have been subject to sharp concessions. In fact, in certain areas there has been little semblance of market stability, especially in sections that have been invaded by distant mills.

In a measure, a similar situation has existed in sheets, notably galvanized and black. The new quotations represent a \$2 a ton advance on those two finishes, as well as on blue annealed, and are \$4 a ton higher than the prices at which much sheet steel is now being delivered. Some mills have also announced a \$2 a ton advance on metal furniture sheets and tin mill black plate.

The advance of \$2 a ton on cold-finished steel bars

and shafting is a corollary of the increase on hot-rolled bars. The new card of extras on cold-rolled strip, not yet generally adopted, is intended to make net prices conform more closely to present production costs. Rather sharp increases on light-gage narrow material and moderately large reductions on the wide and heavier sizes have been made.

Skelp has been marked up \$1 a ton, in keeping with the change in plate quotations.

A formal advance of \$2 a ton on sheet bars, billets and slabs is in prospect, in view of the high rate of activity in strips, sheets and tin plate.

A leading independent maker of wire products has reaffirmed present prices for the second quarter, and other mills are expected to take similar action. The movement of nails and wire into consumption is improving, and specifications against current quarter contracts, carrying higher prices than ruled on January shipments, are heavier.

The trend toward a stronger market promises to extend to iron ore, which has remained unchanged in price for three years. A slight advance, in the opinion of ore producers, is warranted by the situation in the steel industry. Ore stocks at furnaces and on docks on May 1 are expected to be 4,000,000 tons lower than on the same date last year, and some users will need tonnage as soon as water delivery can be made.

Scrap shows further weakness in most markets, with heavy melting steel down 25c. a ton at both Pittsburgh and Chicago. At Cleveland, however, that grade has gone up 50c. a ton, bringing it up to the price that prevailed before the recent decline.

Coke, on the other hand, continues to strengthen under the pressure for domestic fuel. Furnace coke at Connellsville has risen 15c. to \$3 a ton, making a total advance of 25c. a ton in the past fortnight.

Steel production this month will probably equal, if it does not exceed, that of January. Ingot output in the Youngstown district has lost some ground, but the general average for Youngstown, Pittsburgh, Wheeling and Johnstown is fully 85 per cent. At Chicago, where the Steel Corporation subsidiary is adding two blast furnaces to its active list, the district average, lately 92 per cent, is expected to reach 95 per cent before the week end. Operations at Buffalo and in eastern Pennsylvania range from 80 to 90 per cent.

Rail buying is subsiding, although much tonnage remains unrolled. Rail bookings for the 1928-1929 buying movement to date are estimated at 1,600,000 tons, compared with 1,900,000 tons for the previous movement at this time a year ago, a decline of about 16 per cent. Rail accessory purchases, however, are reported to have made a substantial gain.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At Date, One Week, One Month, and One Year Previous

Pig Iron, Per Gross Ton:	Feb. 19, 1929	Feb. 11, 1929	Jan. 22, 1929	Feb. 21, 1928
No. 2 foundry, Philadelphia..	\$21.26	\$21.26	\$21.26	\$20.76
No. 2, Valley furnace.....	17.50	17.50	17.50	17.25
No. 2, Southern, Cin'ti.....	20.19	20.19	20.19	19.69
No. 2, Birmingham.....	16.50	16.50	16.50	16.00
No. 2 foundry, Chicago*.....	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa.....	20.25	19.75	19.75	19.50
Basic, Valley furnace.....	17.50	17.50	17.50	17.00
Valley Bessemer, del'd P'gh..	20.01	20.01	20.01	19.26
Malleable, Chicago*.....	20.00	20.00	20.00	18.50
Malleable, Valley.....	18.00	18.00	18.00	17.25
Gray forge, Pittsburgh.....	18.76	18.76	18.76	18.51
L. S. charcoal, Chicago.....	27.04	27.04	27.04	27.04
Ferromanganese, furnace....	105.00	105.00	105.00	100.00

Rails, Billets, Etc., Per Gross Ton:	Feb. 19, 1929	Feb. 11, 1929	Jan. 22, 1929	Feb. 21, 1928
O.-h. rails, heavy, at mill....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	36.00	36.00	36.00	36.00
Bess. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. billets, Pittsburgh.....	33.00	33.00	33.00	33.00
O.-h. sheet bars, P'gh.....	34.00	34.00	34.00	34.00
Forging billets, P'gh.....	38.00	38.00	38.00	38.00
O.-h. billets, Phila.....	38.30	38.30	38.30	38.30
Wire rods, Pittsburgh.....	42.00	42.00	42.00	44.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.90	1.90	1.90	1.85

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia.....	2.12	2.12	2.12	2.12
Iron bars, Chicago.....	2.00	2.00	2.00	1.90
Steel bars, Pittsburgh.....	1.90	1.90	1.90	1.85
Steel bars, Chicago.....	2.00	2.00	2.00	1.95
Steel bars, New York.....	2.24	2.24	2.24	2.19
Tank plates, Pittsburgh.....	1.90	1.90	1.90	1.85
Tank plates, Chicago.....	2.00	2.00	2.00	1.95
Tank plates, New York.....	2.17½	2.17½	2.17½	2.17½
Beams, Pittsburgh.....	1.90	1.90	1.90	1.85
Beams, Chicago.....	2.00	2.00	2.00	1.95
Beams, New York.....	2.14½	2.14½	2.14½	2.14½
Steel hoops, Pittsburgh.....	2.10	2.10	2.10	2.20

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Feb. 19, 1929	Feb. 11, 1929	Jan. 22, 1929	Feb. 21, 1928
	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh..	2.85	2.85	2.85	2.90
Sheets, black, No. 24, Chicago				
dist. mill.....	2.95	2.95	2.95	3.00
Sheets, galv., No. 24, P'gh..	3.60	3.60	3.60	3.65
Sheets, galv., No. 24, Chicago				
dist. mill.....	3.70	3.70	3.70	3.85
Sheets, blue, 9 and 10, P'gh..	2.10	2.10	2.10	2.10
Sheets, blue, 9 and 10, Chicago				
dist. mill.....	2.20	2.20	2.20	2.20
Wire nails, Pittsburgh.....	2.65	2.65	2.65	2.65
Wire nails, Chicago dist. mill.	2.70	2.70	2.70	2.70
Plain wire, Pittsburgh.....	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill.	2.55	2.55	2.55	2.55
Barbed wire, galv., P'gh.....	3.30	3.30	3.30	3.35
Barbed wire, galv., Chicago				
dist. mill.....	3.35	3.35	3.35	3.40
Tin plate, 100 lb. box, P'gh...	\$5.35	\$5.35	\$5.35	\$5.25

Old Material, Per Gross Ton:

Heavy melting steel, P'gh....	\$18.50	\$18.75	\$19.75	\$15.00
Heavy melting steel, Phila...	16.50	16.50	16.00	13.50
Heavy melting steel, Ch'go..	15.75	16.00	16.00	13.00
Carwheels, Chicago.....	14.50	14.50	14.00	14.00
Carwheels, Philadelphia.....	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh.....	15.00	15.00	16.00	14.50
No. 1 cast, Philadelphia.....	16.50	16.50	16.25	16.00
No. 1 cast, Ch'go (net ton)...	16.00	16.50	15.75	14.50
No. 1 RR. wrot., Phila.....	16.00	16.00	15.50	15.00
No. 1 RR. wrot., Ch'go (net)	14.00	14.50	14.25	11.50

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt.....	\$3.00	\$2.85	\$2.75	\$2.75
Foundry coke, prompt.....	3.75	3.75	3.75	3.75

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	18.12½	18.12½	17.12½	14.25
Electrolytic copper, refinery..	17.75	17.75	16.75	13.82½
Zinc, St. Louis.....	6.35	6.35	6.35	5.47½
Zinc, New York.....	6.70	6.70	6.70	5.82½
Lead, St. Louis.....	6.85	6.62½	6.50	6.07½
Lead, New York.....	6.95	6.85	6.65	6.32½
Tin (Straits), New York.....	49.25	49.75	49.25	51.50
Antimony (Asiatic), N. Y....	9.62½	9.62½	9.50	10.87½

Pittsburgh

Price Advances Laying Groundwork for Second Quarter— Leading Interest Takes Initiative on Plates, Shapes and Bars

PITTSBURGH, Feb. 19.—The week has been notable for the laying of groundwork by steel makers to secure better prices in the second quarter. The leading maker of bars, plates and shapes has announced an advance of \$1 a ton, effective from Feb. 18, and most other producers of one or all of these products have followed suit. The advance means a minimum of 1.95c., base Pittsburgh, and for small and miscellaneous tonnages it is proposed to ask \$2 a ton more. Makers of cold-finished steel bars and shafting, as of Feb. 19, have advanced prices \$2 a ton to 2.30c., base Pittsburgh and Chicago, and 2.35c., Cleveland. No change has been made in cold-rolled strip steel base prices, but a new card of extras, which has been issued by a few makers, will bring sales prices more in line with costs, and this means steep advances in the net prices of narrow light gage material and moderately large reductions in the wide and heavier strips. Hot-rolled strips were marked up a week ago. While some makers have announced higher sheet prices, a few have as yet done nothing. One important maker of wire and nails has announced a continuance of first quarter prices on second quarter contracts.

Price changes refer chiefly to second quarter business. There are small consumers who do not buy much in advance of actual needs and who may be called upon to pay the higher prices, but the number, even among small consumers, who do not have coverage from some mill is few.

Urgency of shipments still is the

keynote of the demand from the automotive industry, and the movement to that consuming channel of strips, sheets and bars shows no abatement. Indeed, strip steel makers find specifications exceeding shipments and now are figuring how soon in April they are likely to complete first quarter contracts, since orders already in

are sufficient to keep productive capacity fully engaged for the next three to five weeks.

Activity in steel for other uses is much less pronounced, although the market is making a very fair record in steel for the agricultural implement industry. With April quotas on tin plate contracts now reaching the mills, there is still a high rate of production and shipments of that product. Pipe is making its best showing in seamless casing. Wire products still await the movement into consumption of some of the heavy shipments from mills last month.

The Youngstown district has lost some ground in ingot output lately, but including it with the Pittsburgh, Wheeling and Johnstown districts, the average ingot production rate is at least 85 per cent of capacity.

Pig iron shows no increase in activity worthy of note. The scrap market is inclined toward weakness, chiefly because dealers have become alarmed over the fact that consumers no longer are pressing hard for deliveries on orders. Some dealers are seeking new orders before the market gets too low. The scarcity of spot beehive oven furnace coke still exists and the market is strong. Prompt furnace coke is now at \$3 a ton.

Pig Iron.—A New Castle, Pa., radiator company has bought its second quarter requirements of foundry iron, amounting to about 2500 tons, and paid the regular price of \$17.50, central Valley furnace, for No. 2. The market otherwise still is more notable for steadiness than activity. There is a fairly good flow of orders for foundry iron in lots of two or three cars to 10 or 12 cars, and sales of Bessemer iron are of much the same character. Some activity lately has developed in malleable iron, and it is apparent that available supplies are none too large. One producer is no longer interested in orders at less than \$18.25, Valley furnace, but the quotations of \$18 have not entirely disappeared. The National Radiator Corporation is reported to have closed for second quarter foundry iron for its Trenton, N. J., works at \$20, eastern Pennsylvania furnace, for No. 2 grade.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$17.50
Bessemer	18.25
Gray forge	17.00
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	\$18.00 to 18.25
Low phos., copper free	26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Semi-Finished Steel.—Prices are very firm on billets, slabs and sheet bars. Buyers who have tried to secure tonnages for March shipment have not found makers anxious to take the business and probably would find it necessary to pay an extra price to persuade producers to depart from a policy of looking out only for the requirements of contract customers. The latter are specifying fully, and surplus supplies are very limited. Continuance of the present activity in strips, sheets and tin plate will probably mean a formal advance in unfinished steel. Wire rods also are very firm in price and are moving well. Pipe skelp is slow, but in keeping with the advance in plates, producers have lifted the quotation \$1 a ton.

Bars, Plates and Shapes.—Carnegie Steel Co., effective Feb. 18, has announced an advance of \$1 a ton on these products. This advance, in which most other producers have gone along, produces a minimum of 1.95c.,

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count, 60 per cent off list	
Machine bolts, 100 count, 60 per cent off list	
Carriage bolts, 100 count, 60 per cent off list	
Nuts, all styles, 100 count, 60 per cent off list	
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

base, Pittsburgh, on all three products. In a general way, the new price will hardly become effective before the second quarter, as important buyers are covered for this quarter. For small and miscellaneous tonnages, some makers have announced a price of 2.05c., base Pittsburgh. On the basis of demand, there is stronger reason for an advance on bars than on shapes and plates, as the latter have not been moving so freely as bars. Plates, however, are strong in the Central West on account of a big demand for large outside diameter pipe that is going to that part of the country and the fact that Western railroad car builders have fared much better than those in the East in the orders placed in the past four months.

Rails and Track Supplies.—Local makers did not share in the 300,000 tie plates recently placed by the Boston & Maine Railroad; the road specified a plate of new design to carry 130-lb. rails, and roll expense would have been heavy for the order if divided among several mills. Current demand for track supplies is chiefly for immediate needs and does not

reach large proportions. Standard-section rails are moving well, but light section rails are dull.

Wire Products.—The movement of nails and wire into consumption is increasing and specifications on first quarter contracts carrying higher prices than ruled on January shipments are somewhat heavier. One important producer has announced reaffirmation of present prices on second quarter contracts, and a similar step by others is probable.

Tubular Goods.—Business averages fairly active, but it is really good only in seamless pipe and tubing. With the approach of open weather, demand for butt welded pipe is expected to increase, but producers are not particularly sanguine as to the prospects for lap welded goods, except line pipe. The gas pipe line of the Mississippi Fuel Corporation to run from Monroe, La., to St. Louis, taking 450 miles of 22-in. pipe for the main line, is yet to be placed. February orders for mechanical tubing from motor car builders are running a little behind those of the same time in January.

Sheets.—Some makers have advanced the common finishes \$2 a ton to 2.95c., base, Pittsburgh, for black, 3.70c., base, for galvanized and 2.20c., base, for blue annealed, but the movement is by no means general and there is as yet no occasion to quote the market differently than it has been quoted for some time. No change is proposed in automobile body sheets, demand for which is materially heavier than that in the other finishes. Sheet business as a whole is good, with a notably brisk call for protection on galvanized sheets from companies engaged in car building and repairs. Concessions from regular prices on black sheets seem to have disappeared, probably as a result of the stimulation given the demand by the possibility of higher second quarter prices, which has prompted buyers to add to their present contracts. Mill operations remain high, though some makers are faring better in current buying than others.

Tin Plate.—April quotas on contracts now are reaching the mills and they are large enough to sustain the recent 90 per cent engagement of productive capacity.

THE IRON AGE Composite Prices

Finished Steel

Feb. 19, 1929, 2.391c. a Lb.

One week ago	2.391c.
One month ago	2.391c.
One year ago	2.364c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, nails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1928	2.391c.	Dec. 11:	2.314c.	Jan. 3
1927	2.453c.	Jan. 4:	2.293c.	Oct. 25
1926	2.453c.	Jan. 5:	2.403c.	May 18
1925	2.560c.	Jan. 6:	2.396c.	Aug. 18
1924	2.789c.	Jan. 15:	2.460c.	Oct. 14
1923	2.824c.	Apr. 24:	2.446c.	Jan. 2

Pig Iron

Feb. 19, 1929, \$18.38 a Gross Ton

One week ago	\$18.38
One month ago	18.42
One year ago	17.75
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1928	\$18.59	Nov. 27:	\$17.04	July 24
1927	19.71	Jan. 4:	17.54	Nov. 1
1926	21.54	Jan. 5:	19.46	July 13
1925	22.50	Jan. 13:	18.96	July 7
1924	22.88	Feb. 26:	19.21	Nov. 3
1923	30.86	Mar. 20:	20.77	Nov. 20

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 1.95c.
F.o.b. Chicago.....	2.00c. to 2.15c.
Del'd Philadelphia.....	2.22c. to 2.27c.
Del'd New York.....	2.24c. to 2.29c.
Del'd Cleveland.....	1.92½c. to 2.00c.
F.o.b. Cleveland.....	1.90c. to 2.00c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Birmingham.....	2.15c. to 2.20c.
C.I.f. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.....	2.00c.
F.o.b. Pittsburgh mills, cut lengths.....	2.25c.
F.o.b. Birmingham, mill lengths.....	2.15c.

Rail Steel

F.o.b. mills east of Chicago dist.....	1.85c.
F.o.b. Chicago Heights mill.....	1.95c.

Iron

Common iron, f.o.b. Chicago.....	2.00c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 1.95c.
F.o.b. Chicago.....	2.00c. to 2.15c.
F.o.b. Birmingham.....	2.15c. to 2.20c.
Del'd Cleveland.....	2.09c. to 2.14c.
Del'd Philadelphia.....	2.10c. to 2.20c.
F.o.b. Coatesville.....	2.00c. to 2.10c.
F.o.b. Sparrows Point.....	2.00c. to 2.10c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
Del'd New York.....	2.17½c. to 2.27½c.
C.I.f. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.90c. to 1.95c.
F.o.b. Chicago.....	2.00c. to 2.15c.
F.o.b. Birmingham.....	2.15c. to 2.20c.
F.o.b. Lackawanna.....	2.00c. to 2.10c.
F.o.b. Bethlehem.....	2.00c. to 2.10c.
Del'd Cleveland.....	2.09c. to 2.14c.
Del'd Philadelphia.....	2.06c. to 2.16c.
Del'd New York.....	2.14½c. to 2.24½c.
C.I.f. Pacific ports.....	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh.....	1.90c. to 2.00c.
Wider than 6 in., P'gh.....	1.80c. to 1.90c.
6 in. and narrower, Chicago.....	2.10c. to 2.20c.
Wider than 6 in., Chicago.....	2.00c. to 2.10c.
Cooperage stock, P'gh.....	2.10c. to 2.20c.
Cooperage stock, Chicago.....	2.20c. to 2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.20c. to 2.30c.
Bars, f.o.b. Chicago.....	2.20c. to 2.30c.
Bars, Cleveland.....	2.25c. to 2.35c.
Shafting, ground, f.o.b. mill.....	2.55c. to 3.50c.
Strips, P'gh.....	2.85c. to 2.95c.
Strips, Cleveland.....	2.95c.
Strips, del'd Chicago.....	3.15c. to 3.25c.
Strips, Worcester.....	3.00c. to 3.10c.
Fender stock, No. 20 gage, Pitts-	
burgh or Cleveland.....	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails.....	\$2.65 to \$2.75
Galvanized nails.....	4.65 to 4.75
Galvanized staples.....	3.35 to 3.45
Polished staples.....	3.10 to 3.20
Cement coated nails.....	2.65 to 2.75

Base per 100 Lb.

Bright plain wire, No. 6 to No. 9	
gauge.....	\$2.50 to \$2.60
Annealed fence wire.....	2.65 to 2.75
Spring wire.....	3.50 to 3.60
Galv'd wire, No. 9.....	3.10 to 3.20
Barbed wire, galv'd.....	3.30 to 3.40
Barbed wire, painted.....	3.05 to 3.15
Woven wire fence (per net ton to	
retailers).....	65.00
Chicago district mill and delivered Chicago	
prices are \$1 per ton above the foregoing. Bir-	
mingham mill prices \$3 a ton higher; Worcester	
Mass., (wire) mill \$3 a ton higher on produc-	
tion of that plant; Duluth, Minn., mill \$2 a ton	
higher; Anderson, Ind., \$1 higher.	

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or North-	
umberland, Pa.	\$2.70
Less carloads, Wheeling or Reading.....	2.80

Sheets

Blue Annealed

	Base per Lb.
Nos. 9 and 10 f.o.b. P'gh.....	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist.....	2.20c. to 2.30c.
Nos. 9 and 10, del'd Cleveland.....	2.29c. to 2.39c.
Nos. 9 and 10, del'd Philadelphia.....	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham.....	2.25c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill.....	2.95c. to 3.05c.
No. 24, del'd Cleveland.....	3.04c. to 3.14c.
No. 24, del'd Philadelphia.....	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham.....	3.00c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh, No. 1 grade.....	4.00c. to 4.10c.
No. 24, f.o.b. P'gh, No. 2 grade.....	3.80c. to 3.90c.

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.60c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill.....	3.70c. to 3.80c.
No. 24, del'd Cleveland.....	3.79c. to 3.89c.
No. 24, del'd Philadelphia.....	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham.....	3.75c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.00c. to 3.10c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c. to 3.20c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh.....	4.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	4.00c.
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Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
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Tin Plate

Standard cokes, f.o.b. P'gh district mills.....\$5.35

Standard cokes, f.o.b. Gary..... 5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$11.20 25-lb. coating I.C. \$16.70

15-lb. coating I.C. 14.00 30-lb. coating I.C. 17.75

20-lb. coating I.C. 15.30 40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series

Numbers

Alloy Differential

2000 (¼% Nickel)..... \$0.25

2100 (1½% Nickel)..... 0.55

2300 (3½% Nickel)..... 1.50

2500 (5% Nickel)..... 2.25

3100 Nickel Chromium..... 0.55

3200 Nickel Chromium..... 1.35

3300 Nickel Chromium..... 3.80

3400 Nickel Chromium..... 3.20

4100 Chromium Molybdenum (0.15 to

0.25 Molybdenum)..... 0.50

4100 Chromium Molybdenum (0.25 to

0.40 Molybdenum)..... 0.70

4600 Nickel Molybdenum (0.20 to 0.30

Molybdenum, 1.25 to 1.75 Nickel) 1.05

5100 Chromium Steel (0.60 to 0.90

Chromium)..... 0.35

5100 Chromium Steel (0.80 to 1.10

Chromium)..... 0.45

5100 Chromium Spring Steel..... 0.20

6100 Chromium Vanadium Bars..... 1.20

6100 Chromium Vanadium Spring Steel

9250 Silicon Manganese Spring Steel

(flats)..... 0.25

Rounds and squares..... 0.50

Chromium Nickel Vanadium..... 1.50

Carbon Vanadium..... 0.95

Above prices are for hot-rolled steel bars,

forging quality. The ordinary differential for

cold-drawn bars is ¾c. per lb. higher. For bil-

lets 4 x 4 to 10 x 10 in., the price for a gross

ton is the net price for bars of the same anal-

ysis. For billets under 4 x 4 down to and in-

cluding 2½ in. squares, the price is \$5 a gross

ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over

carry the billet price; slabs with sectional area

of 12 in. to 16 in. carry a \$5 extra above the

billet price and slabs with a sectional area

under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....\$43.00

Light (from billets), f.o.b. mill..... 36.00

Light (from rail steel), f.o.b. mill..... 34.00

Light (from billets), f.o.b. Ch'go mill..... 36.00

Track Equipment

Base per 100 Lb.

Spikes, 9/16 in. and larger.....\$2.80

Spikes, ½ in. and smaller..... 2.80

Spikes, boat and barge..... 3.00

Tie plates, steel..... 2.15

Angle bars\$2.75
Track bolts, to steam railroads.....\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100
count 70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District

and Lorain, Ohio, Mills

Butt Weld

Inches	Steel	Galv.	Inches	Iron	Galv.
1/8	45	19½	1/4 and 3/8	+11	+36
1/4 to 3/8	51	25½	1/2	23	5
1/2	56	42½	3/4	28	11
3/4	60	48½	1 and 1½	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	48½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

1/8	41	24½	1/4 and 3/8	+13	+48
1/4 to 3/8	47	30½	1/2	23	7
1/2	53	42½	3/4	28	12
3/4	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel	Charcoal Iron
2 in. and 2½ in. 40	1½ in. 1
2½ in.—2½ in. 48	1¾ in. 8
3 in. 54	2 in.—2½ in. 13
3½ in.—3½ in. 56	2½ in.—2½ in. 16
4 in. 59	3 in. 17
4½ in. to 6 in. 48	3½ in. to 3½ in. 18
	4 in. 20
	4½ in. 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler

Tubes

Cold Drawn	Hot Rolled
1 in. 68	3 in. 48
1¼ to 1½ in. 55	3½ to 3½ in. 50
1¾ in. 39	4 in. 53
2 to 2½ in. 34	4½, 5 and 6 in. 42
2½ to 2½ in. 42	

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots.

On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft.

Sizes smaller than 1 in. and lighter than stand-

ard gage take mechanical tube list and dis-

counts. Intermediate sizes and gages not listed

take price of next larger outside diameter and

heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads). 55

Carbon, 0.30% to 0.40%, base..... 50

Plus differentials for lengths over 18 ft. and

for commercial exact lengths. Warehouse dis-

counts on small lots are less than the above.

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Cold-Finished Steel Bars and Shafting.—Leading makers have announced an advance of \$2 a ton, effective Feb. 19, on new business and also have opened books for second quarter contracts at the new prices, which are 2.30c., base Pittsburgh and Chicago, and 2.35c., Cleveland. This advance follows one of \$1 a ton on hot-rolled bars. Makers have felt for some time that the spread between hot and cold bars was too narrow; hence the \$2 advance on cold-finished against \$1 on hot-rolled bars.

Hot-Rolled Flats.—This month's business to date has run ahead of that in the same period in January. Mills generally are committed against full production for the next four weeks. March 15 is the closing date for specifications on first quarter contracts, and enough business is expected by that date to take most of April's rollings. It is a little early for second quarter contracting and the higher prices recently announced have not yet been seriously tested, most consumers being under cover for this quarter.

Cold-Rolled Strips.—A new card of extras has been issued by one or two makers in northern Ohio, but local producers have yet to act. The new card calls for steep increases on light gage narrow strips, in which the tonnage is light, but substantial reductions are made in widths of 12 in. to 24 in. Specifications on existing contracts still are very heavy, exceeding those of the same period last month with most producers, some of whom are not interested in additional business for shipment sooner than five or six weeks.

Coke and Coal.—The scarcity of Connellsville beehive oven furnace coke for prompt shipment still is acute and producers have lately had no trouble in making sales at \$3 per net ton at ovens. An even higher price was paid within the week for about two carloads, but in general the market is \$3. On second quarter tonnages, in which there has lately been some interest, producers are quoting the same figure. No contracting yet has been done because furnace men regard the price as high in view of the fact that pig iron prices show no tendency toward strength. Beehive oven 48-hr. coke still reflects the extra demands of the pig iron producers and the fact that much coke is being crushed for household use, reducing the amount available for market. The coal market does not show life or strength except in household sizes.

Old Material.—The market is very quiet in point of mill buying, but derives a measure of stability from the fact that the mills are taking shipments well on orders, which means a constant demand from dealers who have orders to cover. Offerings of No. 1 railroad heavy melting steel still are sparse and dealers will not take orders for that grade at under \$19. On regular heavy melting steel, there are offerings to mills at \$18.50 and dealers are picking up some fair-

sized lots at \$18. The full spread on this grade, therefore, is \$18 to \$19. Compressed sheets no longer are hard to obtain. They are rather freely offered at \$18.50 and probably could be bought for less if a consumer were interested sufficiently to make a bid. They are quotable at \$18 to \$18.50, but the higher figure is more of an asking price than a sales possibility.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel.	\$18.00 to	\$19.00
No. 2 heavy melting steel.	16.50 to	17.00
Scrap rails	17.75 to	18.25
Compressed sheet steel.	18.00 to	18.50
Bundled sheets, sides and ends	16.50 to	17.00
Cast iron carwheels.	15.00 to	15.50
Sheet bar crops, ordinary.	18.50 to	19.00
Heavy breakable cast.	13.00 to	13.50
No. 2 railroad wrought.	18.50 to	19.00
Hvy. steel axle turnings.	16.50 to	17.00
Machine shop turnings.	11.50 to	11.75
Acid Open-Hearth Grades:		
Railr. knuckles and couplers	20.00 to	20.50
Railr. coll and leaf springs	20.00 to	20.50
Roller steel wheels.	20.00 to	20.50
Low phos. billet and bloom ends	22.00 to	22.50
Low phos., mill plates.	20.50 to	21.00
Low phos., light grades.	19.50 to	20.00
Low phos., sheet bar crops	20.50 to	21.00
Heavy steel axle turnings.	16.50 to	17.00
Electric Furnace Grades:		
Low phos. punchings.	19.50 to	20.00
Hvy. steel axle turnings.	16.50 to	17.00
Blast Furnace Grades:		
Short shovelling steel turnings	12.50 to	13.00
Short mixed borings and turnings	12.50 to	13.00
Cast iron borings.	12.50 to	13.00
Rolling Mill Grades:		
Steel car axles.	21.00 to	22.00
No. 1 railroad wrought.	14.50 to	15.00
Sheet bar crops.	20.50 to	21.00
Cupola Grades:		
No. 1 cast.	15.00 to	15.50
Rails 3 ft. and under.	19.50 to	20.00

Says Direct Scrap Selling Will Prove Uneconomic

That the elimination of the scrap broker and dealer in direct sales of old material by the producer to the consumer will prove economically unsound was the contention of Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, in a talk to the Pittsburgh chapter of the institute last week. Mr. Schwartz said that the scrap industry favors an open market "where the law of supply and demand is the only guide," and he added that in this also lies the best interests of producers and consumers of scrap.

"Purchasing agents who rely on market or trade paper quotations," declared Mr. Schwartz, "should recognize that the scrap iron dealer makes the 'market' in which the scrap producer is interested. Without dealer activity in buying and selling, what looks like an advantageous price today at Philadelphia or Pittsburgh might turn out to be an economic loss.

"Is it untimely to point out that the dealer takes the scrap and is in the market at all times, irrespective of suspensions or embargoes, and that he pays cash for the material? There is no industry in America where the middleman is so necessary as in the scrap industry. The scrap iron business is being conducted on new lines today; the basis for the modern dealer

is service to the mill and recognition that his interests and the interests of the mills are identical."

Railroad Equipment

Lehigh Valley Orders 1000 Freight Cars

FREIGHT car orders placed during the last week totaled slightly more than 2000, the largest having been 1000 for the Lehigh Valley, 500 for the Seaboard Air Line and 340 tank cars for the Sun Oil Co. New contemplated purchases declined somewhat, the only large inquiries having been for 300 to 600 tank cars for a leading tank line and 200 freight cars for the Nashville, Chattanooga & St. Louis. The Union Pacific is inquiring for 25 locomotives and two Chinese roads are asking for prices in this country for 15.

Pere Marquette has ordered 100 Hart ballast cars from American Car & Foundry Co.

Virginian Railway has ordered 500 hopper car bodies from Virginia Bridge & Iron Co.

Carnegie Steel Co. has ordered repairs to 498 hopper cars; 178 to Greenville Steel Car Co. and 160 each to Pressed Steel Car Co. and American Car & Foundry Co. Company is also inquiring for 22 mill-type gondola bodies.

Seaboard Air Line has ordered 500 gondola cars from Standard Steel Car Co. Sun Oil Co., Philadelphia, has ordered 340 tank cars from Standard Tank Car Co.

Union Tank Car Co. is inquiring for from 300 to 600 8000-gal. tank cars.

Chesapeake & Ohio is inquiring for 12 express cars.

American Smelting & Refining Co. has ordered 25 gondola cars from Magor Car Corporation.

American Steel Foundries has ordered three air-dump cars from Magor Car Corporation.

Consolidation Coal Co. has divided orders for 1525 mine cars between Lorain Steel Co. and Bethlehem Steel Co.

Nevada Consolidated Copper Co. is inquiring for 10 air-dump cars.

Nashville, Chattanooga & St. Louis is inquiring for 150 flat-bottom gondola, and 50 hopper cars.

Andes Copper Mining Co. is inquiring for 10 40-ton flat cars.

Chile Exploration Co. has ordered 80 70-ton ore cars from Pressed Steel Car Co.

Fort Worth & Denver City contemplates purchase of 100 50-ton gondola cars.

Union Pacific is in market for 25 locomotives and 20 tenders.

Boston & Maine has ordered five eight-wheel switching locomotives from Baldwin Locomotive Works.

Newfoundland Railway has ordered two Pacific-type locomotives from American Locomotive Co.

Rutland Railroad is inquiring for three Pacific-type locomotives.

Green Bay & Western has ordered two 2-8-0-type locomotives from American Locomotive Co.

Tientsin Pukow Railroad is in market for 10 2-8-2-type locomotives.

Tsingtan Tsinan Railroad will buy five 2-8-0-type engines.

Lehigh Valley has ordered 200 gondola and 500 hopper cars from Bethlehem Steel Co., and 300 box cars from American Car & Foundry Co.

Chicago

Bars, Shapes and Plates Advanced \$1 a Ton—Second Quarter Pig Iron Buying Movement Well Under Way

CHICAGO, Feb. 19.—Chicago producers are naming advances of \$1 a ton on plates, shapes and bars for all current business. Quotations now range from 2.05c. to 2.15c. per lb., Chicago, on these products. For some time most of the transactions have been in the range of 2c. to 2.05c., the 2.10c. quotation applying only to a fractional part of sales. Some sellers are inclined to look at the new maximum of 2.15c. as a nominal price, or at best of no more significance than the previous maximum.

Sales in the past week were the second best so far this year. Tonnages sought are of miscellaneous character and from a wide circle of users. Mill backlogs continue to grow and order books now extend well into the early part of May. Deliveries, especially of bars and plates, are less satisfactory to buyers who now must give consideration to mill schedules that range from three to seven or eight weeks.

Specifications are the largest since the first week in 1928. This tonnage is little influenced by releases of car builders' requirements and the needs of the railroads. Fabricators report that outstanding bids are large for this time of the year, but awards are sluggish. Fresh inquiry totals about 12,000 tons. Foremost among pending projects is the court house at Milwaukee. Bids will be taken March 1 on the 12,000 tons of steel needed.

The Illinois Steel Co. will light No. 6 stack at South Works tomorrow and another furnace will be put in blast at Gary before the end of this week. This will make 10 active at Gary, nine at South Works and one at Joliet, or 20 active out of 27 available. With the two to be added, the total count of active steel mill furnaces here will be 29 out of 36. It is probable that ingot output will reach 95 per cent by end of this week.

Pig Iron.—Second quarter buying is active and coverage is not far from 60 per cent completed. Sales for the week total fully 30,000 tons. February shipments are above the January rate. A user in western Michigan has closed for 10,000 to 15,000 tons of foundry iron. This business was split three ways, Chicago, Detroit and an eastern Lake Erie producer participating. It is reported that this tonnage will move by boat from all three producing centers. Machine tool manufacturers in northern Illinois and southern Wisconsin are particularly interested in future pig iron supplies and a number of them have made additional purchases, not only for the second quarter but to fill out February and March needs that had not been anticipated when earlier purchases were made. After holding steady for several weeks, furnace stocks again are shrinking.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	20.50
Malleable, not over 2.25 sil.....	20.00
High phosphorus.....	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail)..	\$22.51 to 23.01
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 8 per cent.....	30.79
Bess. ferro-silicon, 14-15 per cent...	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—Specifications for these commodities are heavy. It appears, however, that contracts are of ample size and that most users are covered. The result is that buyers are showing practically no interest in purchases. Spiegeleisen is quoted at \$34 a ton, Hazard, Pa., for car lots of the 19 to 21 per cent grade.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferro-silicon, \$83.50 to \$88.50; spiegel-eisen, 19 to 21 per cent, \$40.76.

Plates.—Prices for plates have been advanced \$1 a ton, bringing Chicago quotations to 2.05c. to 2.15c. per lb. Although specifications from car builders are not materially heavier, they are coming to mills at a uniform rate. An oil refiner in the Southwest has ordered 3500 tons of plates, and an inquiry on the Pacific Coast calls for 10,000 tons. Deliveries of plates are becoming more extended and are now in the range of three weeks to eight weeks.

Mill prices on plates, per lb.: 2c. to 2.15c. base, Chicago.

Structural Material.—This market is quiet both in new business and inquiries. Competition is keen, and prices obtained by fabricators are still at the low level of recent weeks. Producers of structural material are advancing prices \$1 a ton.

Mill prices on plain material, per lb.: 2c. to 2.15c. base, Chicago.

Bars.—Chicago mills are announcing advances of \$1 a ton on mild steel bars. This revision takes effect at once. Buying was unusually heavy preceding the changes in quotations. Specifications are in large volume and deliveries range from three to eight weeks. Road machinery builders are busy, and there is no slackening in the rate of output by tractor manufacturers. Heavy shipments of bars are moving to cold-drawn bar producers. Automobile manufacturers have arranged their alloy steel bar schedules for the next six weeks. Local mills are operating at capacity. Prices are firm. Quotations for iron bars are unchanged at 2c. to 2.10c., Chicago. A few consumers of rail steel bars have entered orders at 1.95c. per lb., Chicago Heights. Specifications are fully equal to shipments.

Rails and Track Supplies.—Standard-section rail purchases total 7000

tons, of which 2000 tons is for a local railroad and 5000 tons is for railroads in the Southwest. Orders are expected soon on 7500 tons needed by the Cotton Belt Railroad. Track supply purchases total 6000 tons, and there is a fair tonnage on inquiry.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Cast Iron Pipe.—February is proving to be an active month in sales despite the severity of the weather in the Central West. Several sizable orders have been placed and a number of large municipalities have signified their intention of entering the market at an early date. Prices are well established at \$37 to \$38 a ton, Birmingham, for 6 in. and larger diameters. The railroads are showing no interest, and public utilities, having placed orders in January, are not in need of additional pipe at this time. It is reported here that Cincinnati has closed for 1000 tons of 6 to 12-in. pipe. Madison, Wis., has placed 500 tons with the Central Foundry Co. Hebron, Neb., has ordered 8700 ft. of 8-in. pipe from the American Cast Iron Pipe Co. Foremost among new inquiries is 5300 tons for a sewage treating and water filtration plant for Bloomington, Ill. Other requests for prices are: Apple River, Ill., 175 tons of 6 and 8-in. pipe; Wilsonville, Neb., 21,000 ft. of 2 to 8-in. pipe; Ravenna, Ohio, 6000 ft. of 6-in. pipe.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$45.20 to \$46.20; 4-in., \$49.20 to \$50.20; Class A and gas pipe, \$3 extra.

Sheets.—Prices remain steady while local producers consider following the lead of Eastern mills in announcing a \$2 advance. Operations are at 85 per cent of capacity, and, though specifications amply support this rate, there still exists difficulty in arranging schedules. One producer prefers to operate at full capacity for five days a week rather than to spread incoming orders over the normal working days in each week. Producers are taking a more optimistic view in the matter of specifications, for they believe that, with spring near at hand, the demand for seasonable commodities will result in large releases for sheets. Jobbers of roofing materials report that business is dull on account of the severity of the weather. Agricultural implement manufacturers are taking larger quantities and they have well arranged schedules for a number of weeks. Deliveries are prompt.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.00c.; No. 24 galv., 3.75c.; No. 10 blue ann'l'd, 2.25c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Wire Products.—Demand for wire and wire products is lighter from most classes of users. Jobbers, who have been slowly expanding their stocks in anticipation of an early spring demand, find that they have covered most of their requirements,

especially as severe weather has cut down current sales. Manufacturers are in need of smaller quantities, following liberal specifications in January and in the early part of this month. Although orders are fewer in number, the local trade does not find a recession in manufacturers' output.

Cold-Rolled Strips.—Chicago producers of cold-rolled strips have adopted the new card of extras. Prices remain at 2.85c. to 2.95c. per lb., Cleveland. Current specifications afford operations between 65 and 70 per cent of capacity.

Billets.—Prices for rerolling billets, 4 in. and under 10 in., are steady at \$35 a ton. Local capacity is fully engaged, and mills are booked for six to 10 weeks.

Hot-Rolled Strip.—New buying is quiet, but specifications are heavy, affording capacity output at local mills.

Reinforcing Bars.—This market remains quiet, though there is a noticeable increase in awards of small ton-nages. Fresh inquiry is of moderate size. Although shipments have been retarded by weather unfavorable to outdoor construction, they have cut deeply into shop books, which were comparatively small as the winter started. Shop operations are not above 30 per cent of capacity. Prices remain steady.

Bolts, Nuts and Rivets.—Spot sales are few, but when made are at current prices. Specifications are a trifle smaller in total volume.

Coke.—Prices for by-product foundry coke are firm at \$8 a ton, f.o.b. local ovens, and \$8.75, delivered in the Chicago switching district. Shipments this month are averaging close to the record rate of January. Frozen switch yards are contributing to difficulties in distribution. Delays in transit are common at Milwaukee.

Old Material.—The Chicago scrap market appears to have regained a fair degree of stability after a decidedly downward tendency late last week. Brokers are moving with caution and are no longer bidding up prices. Consumption remains at a high level. Melters insist on prompt

delivery and are more willing to anticipate requirements further in advance. A degree of strength underlies the market. Weakness seems first to have developed in cast iron borings, when offerings, one of which was for 10,000 tons, began to flow into Chicago from remote producing centers. A consumer has taken 5000 tons of hydraulic compressed sheets at \$14.75 a gross ton, delivered, and dealers will freely pay \$14 for a grade acceptable to steel mills. Two new bundling presses are being installed in Chicago. Consumers are taking heavy shipments of heavy melting steel, prices for which have receded after having momentarily reached a peak of \$16.75 a gross ton, delivered. Most of the orders for Gary mills have been filled, and dealers expect that new contracts will soon be placed for delivery to that point.

Prices deliv'd Chicago district consumers:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$15.75 to \$16.25
Shoveling steel.....	15.75 to 16.25
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	14.25 to 14.75
Drop forge flashings.....	12.00 to 13.00
Forg'd cast and r'd steel carwheels.....	19.50 to 20.00
Rail'd tires, charg. box size.....	19.50 to 20.00
Rail'd leaf spring cut apart.....	19.50 to 20.00
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs.....	19.50 to 20.00
Electric Furnace Grades:	
Axle turnings.....	15.75 to 16.25
Low phos. punchings.....	17.75 to 18.25
Low phos. plate, 12 in. and under.....	17.75 to 18.25
Blast Furnace Grades:	
Axle turnings.....	12.75 to 13.25
Cast iron borings.....	11.50 to 12.00
Short shoveling turnings.....	11.50 to 12.00
Machine shop turnings.....	8.50 to 9.00
Rolling Mill Grades:	
Iron rails.....	16.00 to 16.50
Rerolling rails.....	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.....	18.50 to 19.00
Steel rails less than 2 ft.....	19.50 to 20.00
Angle bars, steel.....	17.00 to 17.50
Cast iron carwheels.....	14.50 to 15.00
Malleable Grades:	
Railroad.....	19.50 to 20.00
Agricultural.....	16.50 to 17.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.....	23.00 to 25.00
*Relaying rails, 65 lb. and heav.....	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angles and splice bars	15.00 to 15.50
Iron arch bars and transoms.....	21.25 to 21.75
Iron car axles.....	27.50 to 28.00
Steel car axles.....	17.50 to 18.00
No. 1 railroad wrought.....	14.00 to 14.50
No. 2 railroad wrought.....	14.00 to 14.50
No. 1 busheling.....	12.00 to 12.50
No. 2 busheling.....	7.00 to 7.50
Locomotive tires, smooth.....	14.50 to 15.00
Pipes and flues.....	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast.....	16.00 to 16.50
No. 1 railroad cast.....	15.25 to 15.75
No. 1 agricultural cast.....	14.50 to 15.00
Stove plate.....	12.75 to 13.25
Grate bars.....	13.50 to 14.00
Brake shoes.....	12.50 to 13.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Sealed proposals for the purchase of waste material will be received at the office of the Quartermaster, Camp Dix, N. J., until 11 a. m., Feb. 26. The lots include copper wire, mixed iron scrap, miscellaneous hand tools and other army equipment.

Detroit Scrap Prices Lower

DETROIT, Feb. 19.—The market on old material in the district has shown decidedly weak tendencies. Borings, short turnings and hydraulic compressed have declined 50c. per ton. Heavy melting and shoveling steel and long turnings are down 25c. per ton.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel.....	\$14.75 to \$15.25
Borings and short turnings.....	9.50 to 10.00
Long turnings.....	8.50 to 9.00
No. 1 machinery cast.....	14.00 to 15.00
Automobile cast.....	20.00 to 21.00
Hydraul. comp. sheets.....	14.75 to 15.25
Stove plate.....	11.00 to 12.00
No. 1 busheling.....	11.00 to 11.50
Sheet clippings.....	9.00 to 9.50
Flashings.....	13.00 to 13.50

January in British Output Exceeds 1928 Average

LONDON, ENGLAND, Feb. 16. (By Cable).—January pig iron production was 563,900 gross tons and that of steel ingots and castings was 761,600 tons, both higher than December or than the monthly average for 1928.

January output, compared with that of the monthly average for 1928 and some other years, is given in the following table in gross tons:

	Pig Iron, Tons	Steel Ingots and Castings, Tons
1913—Av. monthly...	855,000	638,600
1920—Av. monthly...	669,500	755,600
1922—Av. monthly...	408,500	490,100
1923—Av. monthly...	620,000	706,800
1924—Av. monthly...	609,900	685,100
1925—Av. monthly...	519,700	616,400
1926—Av. monthly...	203,500	296,700
1927—Av. monthly...	607,800	758,200
1928—Av. monthly...	550,900	710,400
1929—January.....	563,900	761,600

January output this year exceeds that of January a year ago when pig iron was 560,500 tons and steel was 626,200 tons.

Bethlehem Relief Plan Benefits Over \$919,000

Benefits totaling \$919,488 were paid last year to sick and disabled employees and dependents of deceased employees of Bethlehem Steel Corporation and its subsidiaries, according to the third annual report of the company's relief plan. In the year ended Dec. 31, 1928, \$456,715 was paid in death benefits on account of 688 deaths and \$462,773 in disability benefits to 7718 participants on account of sickness or non-industrial accidents.

Since its inauguration on June 1, 1926, \$2,206,604 has been paid out under the relief plan, which was adopted in order to provide a uniform scale of benefits for all of its employees and their dependents. The plan is open to all employees of the corporation in the United States, and at the end of 1928 over 95 per cent of the eligible employees had elected to participate.

Warehouse Prices, f.o.b. Chicago

Base per Lb.

Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.35c.
Reinforc'g bars, rail steel.....	2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands (A in. in Nos. 10 and 12 gages).....	3.20c.
Hoops (No. 14 gage and lighter).....	3.75c.
Black sheets (No. 24).....	3.80c.
Galv. sheets (No. 24).....	4.65c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, stand. railroad.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	3.60c.
Rivets, boiler.....	3.60c.

Per Cent Off List

Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap. or blank.....	60
Hot-pressed nuts, hex., tap. or blank.....	60
No. 8 black ann'd wire, per 100 lb.....	\$3.30
Com. wire nails, base per keg.....	3.20
Cement c'd nails, base per keg.....	3.20

Philadelphia

Plates, Shapes and Bars Up \$1 and Sheets \$2 for Second Quarter Delivery—Scrap Slightly Easier

PHILADELPHIA, Feb. 19.—New business in steel has increased substantially during the past week, and most eastern Pennsylvania mills are operating at 80 to 90 per cent, with enough of a backlog to carry them into the second quarter. One or two eastern Pennsylvania plate mills have already followed the action of Pittsburgh interests in announcing an advance of \$1 a ton, and others expect to follow in a few days. Black and galvanized sheet quotations are expected to follow the \$2 advance made on blue annealed sheets for second quarter contracts, but it is noteworthy that mills have recently encountered some difficulty in obtaining the full price of 3.60c., Pittsburgh, on galvanized, some business having been accepted at \$1 and \$2 a ton concessions. Iron and steel scrap prices continue to show a slight downward trend. Two No. 1 heavy melting steel contracts of 5000 to 6000 tons each have been closed with district consumers at \$16.50 per ton, delivered.

Pig Iron.—In addition to the recent purchase of about 6000 tons of basic iron by a Pottsville, Pa., consumer, two smaller lots of basic have been closed recently in this district. While \$20 per ton, furnace, is being maintained on basic, one recent purchase is reported to have been at \$20.50 per ton, delivered, although the freight rate from the nearest furnace was higher than the price would indicate. Consumers of foundry grade are active buyers of small tonnages, on which \$21 per ton, furnace is being maintained. Recently the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., has been a buyer of carload lots of foundry grade. Low phosphorus is quiet, but prices are firm.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$21.26 to \$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.26
East. Pa. No. 1X, 2.25 to 2.75 sil.	22.26 to 22.76
Basic (del'd east. Pa.)	20.25 to 20.50
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'rg low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	25.29
Va. No. 2X, 2.25 to 2.75 sil.	25.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Billets.—An advance of \$1 a ton in the price of billets to \$34 per ton, Pittsburgh, for rerolling quality is in prospect for second quarter. The current price is strong at \$33, Pittsburgh, for rerolling billets, and \$38, Pittsburgh, for forging quality.

Bars.—Increase in the price by \$1 a ton to 1.95c., Pittsburgh, or 2.27c., Philadelphia, has been announced by leading producers. Most mills are

well booked with business and are maintaining a high rate of operation.

Shapes.—Quotations on small lots are substantially unchanged at 2c., f.o.b. nearest mill to consumer, or 2.06c., Philadelphia, based on Pencoyd, Pa. On desirable tonnages, 1.95c., mill, or 2.01c., Philadelphia, is not uncommon. The past week has been rather quiet for fabricators, but some large projects are in preparation which should require sizable tonnages.

Plates.—One or two eastern Pennsylvania mills have advanced the price of plates for second quarter \$1 a ton to 2.05c., Coatesville, or 2.15c., Philadelphia, and others expect to follow in a few days. Operations are at 80 per cent of capacity.

Sheets.—Producers of blue annealed sheets are quoting 2.20c., Pittsburgh, of 2.52c., Philadelphia, for second quarter and in most cases are offering five to six weeks' delivery on new business. A similar increase of \$2 a ton has been announced by some mills and others are expected to follow shortly. However, galvanized sheet prices have not been firm at 3.60c., Pittsburgh, or 3.92c., Philadelphia, recent sales having shown occasional concessions of \$1 and sometimes \$2 a ton. Black sheets have been quiet, but prices are firm at 2.85c., Pittsburgh.

Imports.—In the week ended Feb. 16, pig iron arrivals at this port totaled 1194 gross tons, of which 798 tons came from British India and 396 tons from the Netherlands. A shipment of 560 tons of spiegeleisen was received from the United Kingdom. Steel imports consisted of 52 tons of steel bars from Belgium, 15 tons from Germany and nine tons from France, 476 tons of structural shapes from Belgium, 281 tons from Germany and 183 tons from France.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.50c.
Cold-fin. steel, sq. and flats	4.00c.
Steel hoops	3.40c.
Steel bands, No. 12 to ⅜-in., inclus.	3.15c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.00c.
†Galvanized sheets (No. 24)	4.75c.
Blue ann'd sheets (No. 10)	3.15c.
Diam. pat. floor plates—	
⅜-in.	5.30c.
½-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.

†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Old Material.—Except for the purchase at \$16.50 per ton of two lots of No. 1 heavy melting steel by consumers at Claymont, Del., and Coatesville, Pa., most grades have been inactive in the past week. Despite the downward trend of prices, brokers report only a moderate tonnage of material obtainable at present buying prices and are apparently not inclined to commit themselves for large contracts in the present uncertain state of the market. No. 2 heavy melting steel has been sold at \$12.75 per ton, delivered to a Pottsville, Pa., consumer and purchase by a Conshohocken, Pa., mill is expected soon. Other grades are quiet and prices are slightly lower.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$16.50
Scrap T rails	16.00
No. 2 heavy melting steel	\$12.50 to 13.00
No. 1 railroad wrought	16.00 to 16.50
Bundled sheets (for steel works)	11.00 to 11.50
Hydraulic compressed, new	15.00 to 15.50
Hydraulic compressed, old	13.50 to 14.00
Machine shop turnings (for steel works)	11.00 to 11.50
Heavy axle turnings (or equiv.)	13.50 to 14.00
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	16.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel works)	12.50 to 13.00
No. 1 low phos., hvy., 0.04% and under	20.00 to 21.00
Couplers and knuckles	19.00 to 19.50
Rolled steel wheels	18.50
No. 1 blast f'nace scrap	10.00 to 10.50
Wrot. iron and soft steel pipes and tubes (new specific.)	15.50 to 16.00
Shafting	18.50 to 19.00
Steel axles	22.00 to 23.00
No. 1 forge fire	13.00 to 13.50
Cast iron carwheels	16.50 to 17.00
No. 1 cast	16.50
Cast borings (for chem. plant)	15.00
Steel rails for rolling	17.00 to 17.50

Employment in Ohio Higher Than in January, 1928

In the iron and steel industries of Ohio, the January employment index of 98 is 1 point less than in December, but is 13 points greater than in January, 1928, states the current bulletin of the Bureau of Business Research of Ohio State University. The decline from December was shared by 88 of the 167 reporting companies.

In the machinery industry the January index was the same as the December index, but was 16 points above the index for the corresponding month last year. The machine tool group showed January employment standing at 123 as against 124 for December. This is 57 points greater than in January, 1928. Manufacturers of material-handling equipment and of power machinery reported January employment at 112, or 4 points greater than in December and 28 points greater than in the first month of 1928.

Total manufacturing employment in Ohio in January declined less than 1 point from December, and showed an increase of 12 points as compared with January, 1928. The index is based on an average month of 1923 as 100.

Cleveland

Upward Trend of Prices Extends to Plates, Shapes and Bars—Sheets Advanced by Most Makers

CLEVELAND, Feb. 19.—A price advance of \$1 a ton to 1.95c., Pittsburgh, on steel bars, plates and shapes, effective immediately, was announced Monday by the leading interest, which has made a corresponding advance on steel bars to 2c., Cleveland. With the higher price has come the announcement that the Cleveland base on bars will no longer apply to small shapes, such as angles, channels and tees that are rolled on bar mills and listed on the bar card. On small shapes the regular Pittsburgh base will hereafter be maintained. The Cleveland bar base was originally adopted to meet the competition of Cleveland mills. But this competition does not exist on small shapes as they are not made by local mills. While the advanced prices are for current orders, and no announcement is made as to the second quarter, it is expected that the new prices will apply to the coming quarter. A Cleveland mill has advanced plates to 1.95c., Pittsburgh, at which it has opened its books for the second quarter. Other independent producers are expected to fall in line with the advance. An Eastern plate mill has firmed up its price to 1.95c. for current orders.

Most sheet mills have adopted the \$2 a ton advance, which applies to all grades except auto body, electrical sheets and enameling stock, and a new card of extras is out on cold-rolled strip. Present prices on wire products and wire rods have been re-established for the second quarter by one independent maker. Indications are that present prices on alloy steel bars will be continued through the second quarter.

Demand for finished steel from the automotive industry has increased, as some of the motor car manufacturers have enlarged production schedules this month, and specifications so far show considerable gain over those of January. Some consumers in the automotive field are in the market for additional tonnage of auto body sheets, although most mills are fully committed for six weeks or longer.

A lull has developed in the building field. Demand for plates, which has been rather slow for some time, shows a gain. Car repair work for the Western Maryland Railroad will require 5200 tons of plates and shapes.

Pig Iron.—Buying of foundry and malleable iron is holding up in fairly heavy volume. Cleveland interests sold 33,000 tons during the week, or about the same amount as during the previous week. The market is particularly active in Michigan. Some of the automobile foundries bought round lots for the second quarter and others placed sizable tonnages to supplement what they had already purchased for the present quarter. There was not much activity in the northern Ohio territory, where many of the smaller foundries have not yet bought for the second quarter. Prices are unchanged and the market has a firm tone. Lake furnaces are holding to \$18.50 to \$19 furnace, the lower price being named by Cleveland furnaces, but they are losing some business to Valley furnaces that are on a \$17.50 base, making their delivered price somewhat lower. Valley iron has been sold for shipment to western Michigan in addition to going to competitive points in western Ohio and Indiana. Lake furnaces quote foundry and malleable iron at \$20 for

Michigan shipment. The present prices of \$16.50 to \$17, Birmingham, have been named for Southern foundry iron for the second quarter by some of the producers.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	\$19.50
S'th'n fdy., 1.75 to 2.25....	\$22.50 to 23.00
Malleable	19.50
Ohio silvery, 8 per cent....	29.00
Basic Valley furnace.....	17.50
Stand. low phos., Valley...	26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Iron Ore.—Interest in the market for the coming season is being taken by some consumers who have made inquiry regarding prices. There is some talk of a slight advance in prices, which have remained unchanged for three years. Some of the ore producers feel that the condition of the iron and steel industry warrants better ore prices. There is a possibility that prices will be announced somewhat earlier than in the past two years, when the market opened in the latter part of April. Low stocks indicate a good movement this season. Ore stocks at furnaces and on docks May 1 are expected to be about 4,000,000 tons lower than on the same date last year, when stocks amounted to 19,368,000 tons. Some consumers will need ore as soon as it can be delivered in the spring and there have already been requests for shipments of cargoes of certain

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struct. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....	2.25c. to 2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to 14 in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.50c.
Galvanized sheets (No. 24).....	4.45c.
Blue ann'd sheets (No. 10).....	3.25c.
No. 9 ann'd wire, per 100 lb.....	\$2.95
No. 9 gal. wire, per 100 lb.....	3.40
Com. wire nails, base per keg.....	2.95

*Net base, including boxing and cutting to length.

grades when navigation opens. The consumption of Lake Superior ore during January amounted to 5,195,034 tons, a gain of 198,206 tons over that of December. The amount consumed in January, last year, was 4,303,132 tons. The amount of furnaces Feb. 1 was 24,878,427 tons, and the amount at furnaces and Lake Erie docks was 30,189,103 tons, compared with 33,349,994 tons on the same date a year ago. There were 176 furnaces in blast using Lake ore Jan. 31, an increase of five for the month. Central district furnaces in January consumed 2,684,549 tons of ore, an increase of 111,608 tons. Lake furnaces used 2,296,778 tons, a gain of 74,834 tons, and all-rail furnaces consumed 127,236 tons, an increase of 12,144 tons. Eastern furnaces used 86,471 tons, a decrease of 380 tons.

Wire Products.—A leading independent producer has reestablished for the second quarter the recent prices of 2.50c. per lb. for wire and \$2.65 to \$2.75 per keg for nails, the lower price for jobbers and the higher for retailers. Makers are still shipping against the lower-priced fourth quarter contracts, but are getting some business at present quotations. A fair seasonal demand has developed for fence.

Cold-Finished Steel Bars.—The demand is heavy from the automotive industry and deliveries are somewhat extended. Prices for the second quarter will be out shortly, and there is talk of a \$2 a ton advance to 2.25c., Pittsburgh.

Semi-Finished Steel.—The present \$42 price for wire rods has been reaffirmed for the second quarter by a leading independent producer. The demand for semi-finished steel in all forms continues heavy and the leading local producer has orders for full operations for 15 days. A Canadian consumer is inquiring for 2000 tons of sheet bars.

Reinforcing Bars.—The demand for small lots has improved and is now fairly good. The 2.25c., Pittsburgh, price is being well maintained for warehouse orders.

Warehouse Business.—The volume is good and orders are well distributed. Because of extended mill deliveries, jobbers are getting some fair-sized orders that ordinarily would be placed with the mills.

Sheets.—Several mills have advanced prices \$2 a ton to 2.20c., Pittsburgh, for blue annealed, 2.95c. for black and 3.70c. for galvanized. It is expected that these advances will become general. Some makers have made a corresponding advance on metal furniture sheets and tin mill black plate. No change is made on auto body sheets, enameling stock and electrical sheets. The demand continues very heavy for auto body sheets. Black sheets in finished grades are moving well, but common black sheets and galvanized sheets are quiet. The latter are still being shaded to 3.50c., Pittsburgh. Deliveries, on

the whole, have become more extended.

Old Material.—The market is firmer on heavy melting steel in the lighter grades used by some of the Cleveland mills, on which quotations have been marked up 50c. a ton, bringing them back to the prices that prevailed before the recent slump. Other grades, except machine shop turnings and blast furnace scrap, are fairly firm at unchanged prices. A Valley mill purchased 1000 tons of No. 1 heavy melting steel at \$18.50. Present prices are meeting considerable mill resistance. Local mills are not buying and appear to have enough scrap under contract to last them a few weeks longer. Scrap is coming out better than recently, this being due, at least in part, to improved weather conditions. Mills are taking liberal shipments against contracts. With increased production schedules by the automobile companies, their scrap lists for March will be heavier than recently.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel.	\$15.50 to	\$16.00
No. 2 heavy melting steel.	15.00 to	15.50
Compressed sheet steel....	15.00 to	15.50
Light bundled sheet		
stamp'gs	12.00 to	12.50
Drop forge flashings.....	13.00 to	13.25
Machine shop turnings....	10.75 to	11.00
No. 1 railroad wrought....	13.25 to	13.50
No. 2 railroad wrought....	16.00 to	16.50
No. 1 busheling.....	12.50 to	13.00
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos. forging crops....	19.00 to	19.50
Low phos., billet, bloom		
and slab crops.....	18.50 to	19.00
Low phos. sheet bar crops....	18.00 to	18.50
Low phos. plate scrap.....	18.00 to	18.50
Blast Furnace Grades		
Cast iron borings	11.50 to	11.75
Mixed bor'g and short		
turn'gs	11.50 to	11.75
No. 2 busheling	11.50 to	11.75
Cupola Grades		
No. 1 cast.....	16.50 to	17.00
Railroad grate bars.....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.....	16.75 to	17.25
Miscellaneous		
Railroad malleable.....	16.00 to	16.50
Rails for rolling.....	16.25 to	16.50

Coke.—The supply of Connellsville coke is not so plentiful as recently, heavy shipments of coal having resulted in some curtailment in production. Some of the better grades of foundry coke have been advanced 25c. a ton, although there is no change in the price range. The present price of \$7.75, Painesville, will probably be re-established for Ohio by-product coke for March. The demand for by-product coke for domestic use continues heavy.

Strip Steel.—The \$2 a ton price advance on hot-rolled strip to 2c., Pittsburgh, for 6 in. and narrower, and 1.90c. for wider than 6 in., has been generally adopted, and a few second quarter contracts have been placed at the new prices, although some producers have not yet opened their books for the next quarter. Some consumers, evidently expecting that the recent advance on cold-rolled strip would be followed by higher prices on hot-rolled material, made additional commitments before the

prices were marked up, and it is believed that most of the larger consumers are covered for their requirements through April. Specifications continue heavy, and the best delivery promises are from two to three weeks. A revised list of extras has been issued on cold-rolled strip, the changes being made to make prices conform more closely to present production costs. These, in a general way, correspond to the recent changes in extras on hot-rolled strip. Radical re-

ductions have been made on wide strip, amounting to \$15 or more per ton, rather sharp advances on strip less than 1-in. wide and moderate advances on 1-in. to 3-in. strip. Mills are now studying the new card of extras, which has not yet been generally adopted, although it is expected that all the producers will put the new extras into effect. The specifications against cold-rolled strip contracts are very heavy. The 2.85c. Cleveland price seems to have disappeared.

New York

Pig Iron Sales in Larger Volume—Structural Steel Outlook More Promising—Scrap Prices Decline

NEW YORK, Feb. 19.—Pig iron sales in this district are showing improvement, having totaled about 9000 tons for the week. Individual purchases were rather small in this territory, but a number of good-sized sales were made in New England. Increasing interest in second quarter is evidenced by the appearance of a number of sizable inquiries. The Worthington Pump & Machinery Corporation is in the market for a total of 3900 tons for delivery at its Harrison, N. J., Elmwood Place, Ohio, Buffalo and New England plants. Shipments are to begin in March and extend through the second quarter. The New York Air Brake Co. wants a total of 1400 tons for next quarter delivery at Watertown, N. Y. Included are 700 tons of malleable, 500 tons of foundry, 50 tons of silvery and 150 tons of low phosphorus iron with a minimum manganese content of 1 per cent. The Foran Foundry & Mfg. Co., Flemington, N. J., is inquiring for 1000 to 2000 tons of foundry for second quarter shipment. The General Fire Extinguisher Co., Providence, R. I., has bought against its inquiry for 2000 tons of foundry. The Rhode Island Malleable Iron Works, Hills-grove, R. I., has bought about 500 tons of malleable for delivery by barge and rail via Beacon, N. Y. The Richmond Radiator Co., New York, has taken no action against its inquiry for 5000 tons for Uniontown, Pa. Prices are substantially unchanged, with Buffalo foundry iron ranging from \$17 to \$17.50, base furnace, and eastern Pennsylvania foundry bringing about \$19.50, base furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75	
to 2.25	\$21.91 to \$22.91
*Buf. No. 2, del'd east.	
N. J.	20.28 to 21.28
East. Pa. No. 2 fdy., sil.	
1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil.	
2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil.	
2.75 to 3.25	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.
*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Plates, Shapes and Bars.—The immediate effect of the advance of \$1 a ton announced by Carnegie, Bethle-

hem, Jones & Laughlin and other steel companies may be a quickening in the specifications for plates and shapes, which have been lagging somewhat behind the rate at which bars have been sought. Eastern producers of plates and shapes are expected to fall in line with the higher schedule, which will mean 2.05c., Coatesville, as a minimum on plates and 2.05c., Bethlehem, as a minimum on shapes. It is noteworthy that these advances have come well ahead of any display of interest on the part of buyers in second quarter contracts. Although the companies which made the advances announced that they became effective at once, no serious test of the new schedule is expected for two or three weeks. A good deal of 1.80c. (Pittsburgh base) business was carried over from the fourth quarter for large buyers, and it remains to be seen whether 1.90c. contracts will provide for considerable of the second quarter requirements. A factor of importance in favor of the price position taken by the mills, however, is that consumption is at a high rate and specifications have, to a large extent, kept abreast of the tonnages which buyers contracted to take in this quarter.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.24c. to 2.29c.; plates, 2.17½c. to 2.22½c.; struc. shapes, 2.14c. to 2.19½c.; bar iron, 2.14c.

Fabricated Structural Steel.—Although fabricated structural lettings in the New York metropolitan district this year have been at least 25 per cent less than in the corresponding period of 1928, improvement is promised by the large increase during the last week or two in contemplated building work. Action is expected soon on an office building at 1441 Broadway, which will take 5300 tons, and other large jobs recently announced include a hotel at Fifth Avenue and Sixty-first Street, requiring approximately 5000 tons, a Lefcourt office building in Newark, which will take 4000 tons, and the Down Town Athletic Club at 18 West Street, New York, on which revised figures are being submitted. Subway and other city work is held up temporarily, but the tonnage to be placed this spring

bulks large. The new Department of Commerce Building at Washington, calling for 20,000 tons, is of interest to New York fabricators. Bids on this job will be opened March 27.

Ferroalloys.—There have been sales of several carloads and small lots of spiegeleisen at \$34 to \$35, furnace, for the 19 to 21 per cent grade. The largest American producer expects to blow in its second furnace this week. There is no new business in ferro-

manganese, but specifications on contract for this alloy and for spiegeleisen are heavy.

Sheets and Strips.—Following recent advances of \$2 a ton on blue annealed sheets, practically all the mills represented in this territory have extended the increase to black and galvanized products, which will now be quoted at 2.95c. and 3.70c. per lb., Pittsburgh, respectively. On blue annealed the new price is 2.20c. Adherence to these levels would represent an advance of \$7 a ton over the minimum reached last July for black sheets, while the increases on galvanized and blue annealed sheets would amount to \$6 and \$4 a ton respectively. However, the new prices will not receive a definite test for a month or six weeks, and much of the business now being shipped is priced at \$4 a ton under the new schedules, having been booked before the advances announced in December were made effective. Consequently, if the mills adhere to the new levels in contracting for second quarter requirements, consumers will be paying \$4 a ton more than they paid during the first three months of the year on the bulk of business. Recently there has been little consumer opposition to 2.85c. and 2.10c. on current small lots of black and blue annealed sheets, but the 3.60c. price on the galvanized product has not been correspondingly strong, and there have been occasional instances in the last two or three weeks when jobbers and some consumers have been able to buy at 3.55c. and even 3.50c. The advance of \$2 a ton on hot-rolled strip seems to have been general and the prevailing quotations for second quarter and for current orders are 2c., Pittsburgh or Cleveland, for material less than 6 in. in width and 1.90c. for 6 to 24-in. stock. Demand for this material is not active in Eastern territory. The revision of extras on cold-rolled strip, which has been announced by one large producer, has not yet been generally adopted and may require some modification before it is universally accepted.

Reinforcing Bars.—The Carroll-McCreary Co., Inc., has booked 700 tons from the Hegeman-Harris Co., Inc., for the Daily News building on East Forty-second Street. Other fair-sized jobs have been placed and the volume of small orders booked during the last week has improved considerably over recent levels. New work continues to come out, but is rather slow in reaching the bidding stage. Prices are unchanged.

Warehouse Business.—Jobbers have eliminated the extra of 10c. per 100 lb. on wide blue annealed sheets, following similar action by the mills some time ago. At the same time an extra of 20c. per 100 lb. has been applied on blue annealed sheets 72 in. wide, a size not usually carried in warehouse stocks.

Cast Iron Pipe.—Prices on gas and water pipe are being maintained by both Northern and Southern makers, and a fair volume of business is in

the market for spring delivery, but mostly from private users. About 8500 tons of gas pipe for the United Gas Improvement Co., Philadelphia, is reported about to be placed with the low bidder, the Herbert Kennedy Co., New York, agent for French cast iron pipe. Municipal inquiry for cast iron pipe continues small.

Prices per net ton deliv'd New York:
Water pipe, 6-in. and larger, \$39.60 to \$41.60; 4-in. and 5-in., \$44.60 to \$46.60; 3-in., \$54.60 to \$56.60; Class A and gas pipe, \$3 extra.

Coke.—Standard furnace coke has developed decided strength in the past week, and quotations for prompt shipment range from \$3.25 to \$3.50 per ton, Connellsville. Even on business for future delivery to consumers with contracts, \$2.90 to \$3.15 per ton is quoted by most producers. This strength is partially reflected in quotations on foundry grade, but demand is small, with the market ranging from \$4 to \$4.50 per net ton, Connellsville. Special brands of foundry coke are unchanged at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and Brooklyn. By-product foundry coke continues at \$9 to \$9.40 per net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Most grades of scrap have registered a further decline of 25c. to 50c. per ton, and brokers report a sufficient supply of material obtainable at the present level, predicting a further recession in the market. No. 1 heavy melting steel was bought at \$16.50 per ton last week by consumers at Claymont, Del., and Coatesville, Pa., and brokers are paying \$16 per ton on this delivery and \$15.50 per ton, delivered to Bethlehem, Pa. Yard grade of heavy melting steel has been bought by a Pottsville, Pa., mill at \$13, \$12.75 and \$12.50 per ton, delivered, and brokers are offering \$12.25 per ton, delivered, to fill these contracts. Heavy breakable cast shows less downward movement than other grades, with brokers paying \$15.50 per ton, delivered to a Florence, N. J., consumer and \$15.50 and \$16 per ton, delivered to Harrisburg, Pa.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$12.50 to \$12.85
Heavy melting steel (yard)	8.50 to 9.50
No. 1 hvy. breakable cast	12.25 to 12.75
Stove plate (steel works)	8.75 to 9.25
Locomotive grate bars	8.75 to 9.25
Machine shop turnings	7.50 to 8.00
Short shoveling turnings	7.50 to 8.00
Cast borings (blast furn. or steel works)	7.00 to 7.25
Mixed borings and turnings	6.50 to 7.00
Steel car axles	18.25 to 18.75
Iron car axles	24.50 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.75
Forge fire	9.00 to 9.50
No. 1 railroad wrought	12.50 to 13.00
No. 1 yard wrought, long	11.50 to 12.00
Rails for rolling	13.50 to 13.75
Cast iron car wheels	12.50 to 12.75
Stove plate (foundry)	9.50
Malleable cast (railroad)	13.00 to 14.00
Cast borings (chemical)	11.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.50c.
Flats and squares	4.00c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'd sheets (No. 10)	3.85c. to 3.90c.
Long terme sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ¾ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¾ in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	.60
1 x 30 in. and smaller	.50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller	.60
¾ x 20 in. and smaller	.50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller	.60
1 x 16 in. and smaller	.50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt.	46	29
¾-in. butt.	51	37
1-3-in. butt.	53	39
2½-6-in. lap.	48	35
7 and 8-in. lap.	44	17
11 and 12-in. lap.	37	12

Wrought Iron—

½-in. butt.	5	+19
¾-in. butt.	11	+9
1-1½-in. butt.	14	+6
2-in. lap.	5	+14
3-6-in. lap.	11	+6
7-12-in. lap.	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC	\$9.70	\$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R.

One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

St. Louis

Pig Iron Shipments Still Heavy—Large Demand for Coke From Detroit—Scrap Easier

ST. LOUIS, Feb. 19.—Heavy shipments continue to feature the pig iron market. Melters are pressing for iron due on contracts, and schedules are being well maintained. In fact, the St. Louis Gas & Coke Corporation, with a daily make of 1000 tons, has been shipping 1200 tons daily since Feb. 1, and there seems to be no let up in the consumption of pig iron. That maker has sold up for first quarter. Its sales this week for second quarter amounted to 5900 tons, including about 3500 tons in various sized lots to stove manufacturers in the district; 750 tons to an Illinois specialty maker, 400 tons to a Missouri lead concern, and 300 tons of malleable. Prices continue firm.

Prices per gross ton at St. Louis:
No. 2 fdy., sil. 1.75 to 2.25, f.o.b.
Granite City, Ill. \$20.00
Malleable, f.o.b. Granite City..... 20.50
N'th'n No. 2 fdy., deliv'd St. Louis.. 22.16
Southern No. 2 fdy., deliv'd..... 20.92
Northern malleable, deliv'd..... 22.16
Northern basic, deliv'd..... 22.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Coke.—The demand for domestic grades of coke in the Detroit district continues heavy. A local by-product concern has shipped about 600 carloads to Detroit since Jan. 25, and expects its shipments to that market by the end of the month will be about 25,000 tons. A shortage in foundry coke is reported.

Finished Iron and Steel—The Granite City Steel Co. has made no announcement with regard to the action of a number of other sheet mills in advancing prices \$2 a ton. Plate business has been good with the Granite City Steel Co., and it has a backlog of several weeks' rollings. Tin plate buying is picking up, and

some of the larger can manufacturers are expected to increase specifications considerably next month. Sheet buying has slowed up. Business is quiet with structural fabricators.

Old Material.—The market for old material is slightly weaker, due to the drop in Chicago and also to more open weather, enabling railroads to make shipments. Heavy melting and shoveling steel, miscellaneous rails, No. 2 railroad wrought, No. 1 busheling are 25c. off, while stove plate is 25c. higher. A freer movement in scrap is expected from now on. Railroad lists include: Chicago, Rock Island & Pacific, 13,000 tons; Chesapeake & Ohio, 6177 tons; Louisville & Nashville, 7500 tons; Pere Marquette, 1340 tons; St. Louis & Hannibal, 8

carloads, and Pullman Co. (St. Louis), 7 carloads.

Dealers' buying prices, per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel.....	\$14.25 to \$14.75
No. 2 heavy melting or shoveling steel.....	13.75 to 14.25
No. 1 locomotive tires.....	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart...	16.00 to 16.50
Railroad springs	17.50 to 18.00
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought...	14.50 to 15.00
No. 1 busheling	10.50 to 11.00
Cast iron borings and shoveling turnings	9.75 to 10.25
Iron rails	15.00 to 15.50
Rails for rolling	16.50 to 17.00
Machine shop turnings...	10.00 to 10.50
Heavy turnings	10.25 to 10.75
Steel car axles	21.00 to 21.50
Iron car axles	28.00 to 28.50
Wrot iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought...	15.00 to 15.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	15.50 to 16.00
Cast iron carwheels	15.50 to 16.00
No. 1 machinery cast.....	16.00 to 16.50
Railroad malleable	16.50 to 17.00
No. 1 railroad cast	15.00 to 15.50
Stove plate	13.25 to 13.75
Agricult. malleable	14.00 to 14.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Pacific Coast

Demand for Reinforcing Steel Increasing—Structural Market Also Active—Bids Opened on Big Bridge

SAN FRANCISCO, Feb. 16 (*By Air Mail*).—A number of structural steel, reinforcing bar and cast iron pipe awards were made during the week. Bids were opened on the Southern Pacific bridge over the Carquinez Straits, involving the largest tonnage of structurals ever to come up for figures on the Coast. The project calls for 25,000 tons of shapes and 2000 tons of reinforcing steel bars.

Pig Iron.—Trading in foundry iron is limited to small lots for prompt shipment. Prices are unchanged.

Prices per gross ton at San Francisco:
*Utah basic.....\$25.00 to \$26.00
*Utah fdy., sil. 2.75 to 3.25 .. 25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25 .. 24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Demand for reinforcing steel bars is increasing and awards this week, totaling 1573 tons, were the largest for any week so far this year. Included among the larger lots were 500 tons for an office building in San Francisco, placed with the Soule Steel Co., and 315 tons for an apartment building in Los Angeles. Bids were opened this week on 1700 tons as a minimum for the Southern Pacific Carquinez Straits bridge and on 525 tons for the Western Electric Co. plant at Emeryville, Cal. Out-of-stock prices are now firmer, and 2.20c. to 2.30c., base, on carload lots is the range in the Los Angeles and San Francisco districts, with 2.60c. base applying on less than carload lots. Merchant bars appear firm at 2.30c., c.i.f. Coast ports.

Plates.—Following several weeks of

active demand for plates, the market now is quiet and only two small awards were placed. These were 100 tons for a 10-in. welded pipe line at Suisun, Cal., booked by the Montague Pipe & Steel Co., and 250 tons for a motor ship for the Foshay Co., to be built by the Lake Washington Shipyards. The Shell Oil Co. has an inquiry out for six 118,000-bbl. tanks for its Domingues field, calling for 2000 tons. Bids were opened this week on 1500 tons for a 60-in. pipe line at Denver for the Board of Water Commissioners. Prices range from 2.20c. to 2.25c., c.i.f.

Shapes.—Structural shape awards so far this year are double the total for the same period in 1928. Interest this week was centered in the opening of bids today on 25,000 tons for the Carquinez Straits bridge for the Southern Pacific. Important lettings included 2500 tons for a hotel in Victoria, B. C., 1500 tons for the San Francisco Stock Exchange Building, placed with Dyer Brothers; 1100 tons for a factory in Los Angeles for the

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24).....	4.10c.
Galv. sheets (No. 24).....	4.95c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.15c.
Galv. corrug. sheets.....	5.00c.
Structural rivets	3.75c.
Boiler rivets	3.75c.

Per Cent Off List

Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.....	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes.....	3.15c.
Soft steel bars	3.15c.
Small angles, 7/8-in. and over.....	3.15c.
Small angles, under 7/8-in.....	3.55c.
Small channels and tees, 7/8-in. to 2 3/4-in.	3.75c.
Spring steel, 7/8-in. and thicker.....	5.00c.
Black sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.80c.
Galv. sheets (No. 24).....	5.30c.
Struc. rivets, 7/8-in. and larger.....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c't'd nails, 100 lb. keg.....	3.40

Samson Tire & Rubber Co., booked by McClintic-Marshall Co., and 750 tons for a church at Seattle, taken by Wallace Bridge & Structural Steel Co. Bids were opened this week on 1936 tons of sheet piling for Long Beach, Cal., on 525 tons for a warehouse in Emeryville, Cal., and on 600 tons for an apartment building in San Francisco. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe awards were somewhat heavier this week and totaled close to 1000 tons. The Grinnell Co. secured 119 tons of 8-in. Class B pipe for Eureka, Cal.; the U. S. Cast Iron Pipe & Foundry Co. took 240 tons of 8 and 16-in. Class B pipe for Aberdeen, Wash., and 234 tons of 20 and 24-in. Class B pipe for Glendale, Cal. Santa Ana, Cal., placed 100 tons of 6 to 16-in. Class B pipe with the National Cast Iron Pipe Co. and 76 tons of 4-in. Class B pipe

with the Pacific States Cast Iron Pipe Co. Henry Sacco took 219 tons of 6 to 16-in. Classes B and C pipe for Seattle. Suisun, Cal., which inquired for 405 tons of 8 or 10-in. Class B pipe, purchased welded steel pipe. The Pacific States Cast Iron Pipe Co. was low bidder on 2, 4 and 6-in. Class 150 for the East Bay Municipal Utility District, Oakland, involving 1100 tons. Bids were opened this week on 338 tons of 4 to 12-in. Class B pipe for Anaheim, Cal., on 315 tons of 6 and 10-in. Class B pipe at Tacoma, and on 440 tons of 6 to 12-in. Classes B and C pipe for Seattle. Los Angeles has come into the market for 1710 tons of 12-in. Class 350 pipe.

Steel Pipe.—Inquiries for standard steel pipe mostly involve small tonnages. Demand for oil country goods, especially well casing, continues well sustained in the southern part of the State.

Birmingham

Bars, Plates and Shapes Advanced \$1 a Ton—Heavy Pig Iron Shipments Continue

BIRMINGHAM, Feb. 19.—Pig iron shipments have been holding up remarkably well, and it is doubtful if any iron has been stocked this month. There is a slight increase in small-lot buying. No inquiries are reported for second quarter. The No. 2 furnace of the Republic Iron & Steel Co., which had been out for relining since June, 1928, was blown in Feb. 11 on foundry iron. Ten furnaces are on foundry, seven on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	\$16.50 to \$17.00
No. 1 fdy., 2.25 to 2.75 sil.	17.00 to 17.50
Basic	16.50

Finished Steel.—Effective Feb. 18, prices on bars, plates and shapes were advanced from 2.15c. to 2.20c. New business in these lines has been brisk for several weeks and mills report good schedules. Sheets and railroad accessories are active. Sheet production was further increased last week when the Tennessee company placed two new units in operation at Fairfield. The fabricated structural steel market has just experienced one of the most active weeks of the year. The Ingalls Iron Works Co. booked an order for 3200 tons for the Pullman plant at Bessemer. New orders of the Virginia Bridge & Iron Co. included 1600 tons for the Murray Body Building Corporation at Memphis; 600 tons for a bridge at Jacksonville, Fla., and 600 tons for bridges for the Central of Georgia Railway Co. Some good tonnages are included in pending business. Reinforcing bar manufacturers report fair activity. The Gulf States Steel Co. will furnish 150 tons of bars for the Gadsden plant of the Goodyear Tire & Rubber Co. Open-hearth operations are the same as last

week; the Tennessee company has seven on at Ensley and six at Fairfield, and the Gulf States Steel Co. has four active at Alabama City.

Cast Iron Pipe.—A steady volume of small-lot orders has been the chief characteristic of the market for the last 10 days. The Central Foundry Co. has booked 4000 ft. of 6-in. pipe for Crystal Springs, Miss. Plants in the district report a total of 37 projects up for figures from different sections of the country, largely for municipal requirements. This is said to be the largest pending tonnage at one time in a number of months. Plant operations are still below normal for this season. One plant has large stocks and is operating only two or three days a week. Base prices of \$37 to \$38 on 6-in. and larger sizes continue with fair firmness.

Coke.—The foundry coke market has been satisfactory during the past few weeks and producers report no changes in the volume of requisitions being received. The past week was the most active of the year for domestic coke. Both spot and contract coke continue to sell at \$5.

Old Material.—Demand is light and melters are slow in accepting shipments. Quotations are unchanged, but prices are weak.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails	\$12.00 to 12.50
Short shoveling turnings..	9.00
Cast iron borings	8.00
Stove plate	13.50
Steel axles	20.00
Iron axles	22.00
No. 1 railroad wrought..	10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast	15.00
Tramcar wheels	13.00 to 14.00
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem..	13.50 to 14.00

Canada

Inquiries Indicate Active Year in Building

TORONTO, ONT., Feb. 19.—Canadian pig iron markets continue to hold their strength. Current business, while in fairly large tonnage, is confined to spot delivery. Sales for the week totaled about 1400 tons. Prices are being asked on several thousand tons for second quarter, but producers have not opened their books for that period.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$23.60
No. 2 fdy., sil. 1.75 to 2.25.....	23.60
Malleable	23.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$25.00 to 25.50
No. 2 fdy., sil. 1.75 to 2.25.....	25.00 to 25.50
Malleable	25.00 to 25.50
Basic	24.00 to 24.50
Imported Iron, Montreal Warehouse	
Summerlee	33.50
Carron	33.00

Structural Steel.—New building programs are continually being announced. While many of these are still in the preliminary stage, others are to be put through almost immediately. For Toronto, about 30,000 tons of structural steel business is pending for early closing, and about 20,000 tons is pending in Montreal. From western Canada extensive building programs are also reported. For Edmonton, Alberta, buildings planned for immediate construction represent an investment of \$5,000,000. Calgary, Winnipeg, Victoria and Vancouver also report improvement in building activities.

Old Material.—The heavy demand for iron and steel scrap of the past several months is beginning to tell on the available supply in this country. Shortage of iron scrap is worrying dealers who have contracts to fill, and who find considerable difficulty in making purchases. The supply of steel grades, while sufficient for current needs, is by no means as plentiful as is desirable, and efforts to replenish yard holdings are active.

Dealers' buying prices:

Per Gross Ton	
Toronto	Montreal
Heavy melting steel \$9.50	\$8.00
Rails, scrap.....	9.00
No. 1 wrought.....	\$11.00 to 11.50
Machine shop turnings	5.00
Boiler plate	6.00
Heavy axle turnings	7.50
Cast borings	5.00
Steel turnings	6.50
Wrought pipe	6.00
Steel axles	20.00
Axles, wrought iron	22.00
No. 1 machinery cast	16.00 to 17.00
Stove plate	13.00
Standard carwheels	16.00
Malleable	13.00
Per Net Ton	
No. 1 machinery cast	15.00
Stove plate	9.00
Standard carwheels	13.00
Malleable scrap	13.00

Electric industrial trucks and tractors to the number of 148 were shipped in January, against 153 in December, according to reports received by the Department of Commerce.

Cincinnati

Heavy Pig Iron Consumption Gives Strength to Market— Coke Demands Still Large—Scrap Easier

CINCINNATI, Feb. 19.—Pig iron has been fairly steady the past week, although there are conflicting factors which make it difficult to determine the trend. District melters are operating on heavy production schedules and are taking substantial tonnages of iron on current contracts. This good rate of consumption is lending strength to the market. On the other hand, there is little demand for second quarter iron and in some cases sellers are shading silicon differentials or are making other concessions to buyers to obtain business. A local melter is reported to have placed 1300 tons of foundry iron with an Ohio River furnace for barge delivery. Since the water rate is lower than that by rail, the delivered price is somewhat less than that quoted by furnaces in this immediate district. Pending orders include from 500 to 1000 tons of foundry for a central Indiana consumer and 600 tons of malleable for a Richmond, Ind., company. Alabama and Tennessee producers are quoting iron for second quarter delivery at \$16.50, Birmingham.

Prices per gross ton, deliv'd Cincinnati:
So. Ohio fdy., sil. 1.75 to 2.25 \$20.39 to \$20.89
Ala. fdy., sil. 1.75 to 2.25... 20.19 to 20.69
Ala. fdy., sil. 2.25 to 2.75... 20.69 to 21.19
Tenn. fdy., sil. 1.75 to 2.25... 20.19
S'th'n Ohio silvery, 8 per cent 27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—District sheet mills have booked heavy tonnages in the past week and have increased backlogs to a point where operations at 100 per cent of capacity are assured for the next month. For the second quarter a price of 2.20c., Pittsburgh, has been named on blue annealed, but black sheets will continue to sell to large buyers at 2.85c. Galvanized sheets at 3.60c. and automobile body stock at 4.10c. will be unchanged. Hot-rolled strip steel is quoted for second quarter delivery at 1.90c., Pittsburgh, for material wider than 6 in. The leading producer of cold-rolled strip steel

in this territory will adopt the new card of extras issued by another maker, applying it to second quarter business. Demand for steel bars has been well maintained, but structural material is quiet on account of a seasonal lull. Fabricating shops are running part time pending a pickup in orders. The nail situation is unchanged, with an Ironton, Ohio, mill offering common wire nails at about \$2.70, delivered Cincinnati. Some Eastern makers are meeting this price, but others are refusing to take business under \$2.79, which is equivalent to \$2.65 at Ironton plus a 14c. barge rate to this city.

Warehouse Business.—A Kentucky jobber is reported to be selling common wire nails at \$2.60 per keg, f.o.b. warehouse. The local trade, however, is not taking cognizance of this concession and is maintaining the regular schedule. Aside from this irregularity, prices are steady and unchanged.

Coke.—The shortage of both foundry and domestic by-product coke in Michigan is as yet unrelieved, and makers in this district are unable to

produce sufficient tonnage to supply the demand. There is a possibility that by-product foundry coke may be advanced 50c. a ton on March 1, although makers have not definitely decided on the schedule for next month. Domestic grades will be unchanged.

Old Material.—The scrap market is in a nervous state, and dealers are buying cautiously until a more definite trend in prices appears. Meanwhile, heavy melting steel is unchanged, but several items, including loose sheet clippings, have declined from 25c. to 50c. a ton. District steel plants are accepting fair tonnages on present contracts, but are not buying for forward delivery. Railroads are reported to have received about the same prices for their offerings this month as in January.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.75 to \$14.25
Scrap rails for melting.....	13.75 to 14.25
Loose sheet clippings.....	10.00 to 10.50
Bundled sheets.....	11.00 to 11.50
Cast iron borings.....	10.00 to 10.50
Machine shop turnings.....	9.50 to 10.00
No. 1 bushelling.....	11.00 to 11.50
No. 2 bushelling.....	7.50 to 8.00
Rails for rolling.....	14.50 to 15.00
No. 1 locomotive tires.....	14.25 to 14.75
No. 2 railroad wrought.....	13.75 to 14.25
Short rails.....	18.50 to 19.00
Cast iron carwheels.....	12.75 to 13.25
No. 1 machinery cast.....	19.25 to 19.75
No. 1 railroad cast.....	15.25 to 15.75
Burnt cast.....	10.50 to 11.00
Stove plate.....	10.50 to 11.00
Brake shoes.....	10.50 to 11.00
Railroad malleable.....	15.25 to 15.75
Agricultural malleable.....	14.25 to 14.75

Boston

Pig Iron Prices Are Easier—Coke and Pipe Sales Increasing —Some Scrap Grades Decline

BOSTON, Feb. 19.—A Rhode Island foundry has bought upward of 1000 tons of Buffalo malleable iron at approximately \$21.28 a ton, delivered, on a \$4.28 water and rail rate, or the equivalent of \$17 a ton, furnace. At least two Buffalo furnaces are disregarding silicon differentials, sales of comparatively small tonnages having been made recently in New England of No. 2X and No. 1 at \$21.91 a ton, based on a \$4.91 all-rail freight rate. The same furnaces, however, have made sales of these grades at \$17.50 a ton, furnace, and at \$18 in one instance, at least. The Mystic Iron Works quotes \$20 a ton, base Everett, Mass. Small tonnages of eastern and western Pennsylvania and Alabama irons have been sold for mixture purposes at full asking prices.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25..	\$21.91 to \$22.91
*Buffalo, sil. 2.25 to 2.75..	22.41 to 23.41
East. Penn., sil. 1.75 to 2.25..	24.15 to 24.65
East. Penn., sil. 2.25 to 2.75..	24.65 to 25.15
Va., sil. 1.75 to 2.25.....	26.91
Va., sil. 2.25 to 2.75.....	27.41
Ala., sil. 1.75 to 2.25.....	23.41 to 25.77
Ala., sil. 2.25 to 2.75.....	23.91 to 26.27

Freight rates: \$4.91 all rail from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate.

Cast Iron Pipe.—Waterville, Me., has closed on 500 tons of pipe, its 1929 requirements, and Melrose, Mass., on several hundred tons, with the Warren Foundry & Pipe Co. The

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Squares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reforc. bars.....	3.15c.
Rail steel reforc. bars.....	3.00c.
Hoops.....	4.05c.
Bands.....	3.50c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	3.90c.
Galvanized sheets (No. 24).....	4.75c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	.65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c'd nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	7.55
Net per 100 Ft.	
Lap-weld. steel boiler tubes, 2-in.....	\$16.00
4-in.....	33.00
Seamless steel boiler tubes, 2-in.....	17.00
4-in.....	34.00

United States Cast Iron Pipe & Foundry Co. has sold 400 tons of 6 to 12-in. to Springfield, Mass. Woonsocket, R. I., has closed bids on 600 tons of 4 to 18-in. pipe, but has made no award. Medford, Mass., took bids Feb. 18 on 300 tons of 6, 8 and 12-in. pipe, and Lowell, Mass., will close Feb. 21 on 100 tons of 6 and 8-in. pipe. New England municipalities are now covering their spring requirements quite freely, in many instances privately, and aggregate pipe sales the past week run fairly large. With pipe foundries operating at 70 to 80 per cent of capacity, they are less inclined to shade prices on small pipe, but the large dimensions are still subject to concessions. Prices openly quoted are: 4-in., \$49.10 a ton, delivered common Boston freight rate points; 6 to 16-in., \$44.10; 20-in., \$43.60. A differential of \$3 is asked on Class A and gas pipe.

Coke.—That the New England iron melt is increasing is attested by larger aggregate shipments on contract of by-product foundry coke. New England ovens estimate February shipments of foundry coke to date as 20 per cent ahead of those in January, this year, and 15 to 20 per cent ahead of those in February, 1928. By-product foundry coke remains at \$11 a ton, delivered within a \$3.10 freight rate zone, with little likelihood of changing during the next month.

Old Material.—Prices of forge flashings and mixed borings and turnings are strong on active buying. A somewhat better inquiry for shafting and steel axles has strengthened the market for those materials. Export scrap is still moving in limited quantities at \$10.25 to \$10.50 a ton, f.o.b. dock here. Local dealers are getting a fair amount of business in textile and machinery cast and railroad malleable. Otherwise, the scrap market is weak, with some prices off 25c. to 50c. a ton. Little material is moving out of New England for Pittsburgh district delivery, and shipments to eastern Pennsylvania consumers has been scaled down.

Buying prices per gross ton f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	\$12.00 to \$12.25
Scrap T rails	12.00 to 12.25
Scrap girder rails	11.25 to 11.50
No. 1 railroad wrought	11.00 to 11.25
No. 1 yard wrought	9.00 to 9.25
Machine shop turnings	6.25 to 6.50
Cast iron borings (steel works and rolling mill)	6.50 to 7.00
Bundled skeleton, long	9.00 to 9.50
Forge flashings	10.25 to 10.75
Blast furnace borings and turnings	6.00 to 6.50
Forge scrap	8.50 to 9.50
Shafting	14.50 to 15.00
Steel car axles	17.50 to 18.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	10.75 to 11.25
Rails for rolling	12.50 to 12.75
Cast iron borings, chemical	10.00 to 10.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$14.50 to \$15.00
No. 1 machinery cast	16.00 to 16.50
No. 2 machinery cast	14.00 to 14.50
Stove plate	11.00 to 11.50
Railroad malleable	17.00 to 17.50

\$16 to \$17. Where buyers are not drawing the line too closely, \$16 to \$16.50 is the range, but selected material brings \$17. One dealer reports two or three sales at \$17, while another reports one sale at \$17. On the other hand, a shipment of No. 1 machinery cast to Dunkirk from Buffalo at \$15.10 on cars, Buffalo, is reported. Malleable scrap is very scarce, with demands from three or four local sources. A sale of a sizable lot of railroad malleable was made at \$19.50. Dealers are offering \$14.50 for No. 2 heavy melting steel for shipment to a local mill on an old \$14.50 order. Machine shop turnings are \$9.75, Niagara Falls, or about \$8.50, Buffalo.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$17.50 to \$18.00
No. 2 heavy melting steel	14.25 to 14.50
Scrap rails	17.00 to 18.00
Hydral. comp. sheets	15.00 to 15.25
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.00 to 14.50
No. 1 busheling	16.50 to 17.00
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	8.00 to 8.50
No. 1 railroad wrought	13.50 to 14.00
Acid Open-Hearth	
Knuckles and couplers	19.00 to 19.50
Coil and leaf springs	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings	13.50 to 14.00
Blast Furnace Grades	
Short mixed borings and turnings	11.50 to 12.50
Cast iron borings	11.50 to 12.50
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	14.50 to 15.00
Locomotive grate bars	13.50 to 14.00
Steel rails, 3 ft. and under	19.50 to 20.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Industrial	18.50 to 19.00
Railroad	18.50 to 19.00
Agricultural	18.50 to 19.00

Buffalo

Pig Iron Sales for Second Quarter Total 18,000 to 20,000 Tons—Scrap Market Shows Strength

BUFFALO, Feb. 19.—While the pig iron market has been quiet so far as most of the producers are concerned, one furnace interest reports selling a total of 18,000 to 20,000 tons, mostly for second quarter delivery. About 15,000 tons is said to have been placed by melters in the Buffalo district, the lots ranging from 1000 to 2000 tons. All of the iron sold was foundry and malleable, with the exception of 1000 tons of basic, which went to a district consumer. According to the selling interest, the only price concessions were on business to the east, where the rate was against Buffalo iron. The rest of the selling in the district has been confined to 200 and 300-ton lots on which \$18.50, base, has been maintained. It is reported that the Massey-Harris Harvester Co. has purchased iron for its Toronto requirements. Among current inquiries is one from New Jersey for 1000 tons of No. 2 plain and 1000 tons of No. 2X.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil.	1.75 to 2.25	\$18.50
No. 2X fdy., sil.	2.25 to 2.75	19.00
No. 1 fdy., sil.	2.75 to 3.25	20.00
Malleable, sil. up to 2.25		19.00
Basic		17.50
Lake Superior charcoal		27.28

Finished Iron and Steel.—Operations continue at 85 to 90 per cent of capacity. Bars are firm and the demand good and the same applies to shapes. Sheet prices have been advanced for the second quarter. Automobile body sheets remain at 4.10c. New bids on the Burgard Vocational School, requiring 330 tons of reinforcing bars, will be opened Feb. 28. A new hotel will require 200 tons of bars.

Old Material.—A sale of 4000 tons of No. 1 heavy melting steel was made the past week at \$18 and another sizable lot of the same material brought the same price. A large mill here bought a tonnage of scrap rails, for which it paid \$18. Sales of No. 1 machinery cast have been made at

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.60
Black wire, base per 100 lb.	3.75

Power Consumption Shows High Industrial Activity

Productive activity in the United States in January is placed by *Electrical World* at an index of 132.5, compared with 127.3 in December and with 118.4 in January, 1928. The figures are based upon consumption monthly of electrical energy by about 3600 manufacturing plants in various industries and scattered throughout the country. The metal industries group, at 142.6, was well above the average of all industrial groups and showed a consistent gain over both December and January of last year. Rolling mills and steel plants are given an index of 153.5 for January, while 135.8 is assigned to metal-working plants, including both ferrous and non-ferrous metals.

Automobile plants, including those manufacturing parts, were placed at 149.4 in January, compared with 130 in December. Shipbuilding showed a gain, having been 108.2, compared with 91.8 in the preceding month. Industries outside the metal-working field, with the exception of rubber, which advanced considerably, showed slight changes.

Heavy Forging Makers Form Association

Plan Collection of Statistics, Standardization of Materials and Elimination of Wasteful Methods

MAKERS of heavy forgings and reheated products have organized the Forging Manufacturers Association with headquarters in the Grand Central Terminal Building, New York. It will have as its purposes the systematic collection, compilation and distribution of detailed statistical data pertaining to the forging industry; the promotion as far as possible of the standardization of materials, manufacturing methods and products; the elimination of wasteful methods; maintenance of high and uniform standard products and the improvement of the industry in any other way that will be mutually beneficial to both manufacturer and consumer, and the investigation of costs of operation, labor conditions, requirements of consumers and general market conditions.

As an industry the manufacturers of heavy forgings in this country hold that they lack the necessary information on which to base good business judgment, particularly as to the cost and marketing of their products. The new association desires to stabilize the industry, and will seek to accomplish this by collecting and distributing data with respect to volume of production, volume of consumption, stocks on hand, shipments, credits, rejections of product and causes thereof, cost and cost accounting methods and cooperation with consumers in metallurgical or engineering service.

Specification Committee Formed

The association has a specification committee composed of a staff of metallurgists to confer with consumers and assist them to determine the proper materials and treatments for their needs, with the hope of preventing waste occasioned by unwise or impractical specifications.

The metallurgical departments of the various member companies have for years carried on research work of tremendous value to the trade but because of lack of coordination and lack of channels for disseminating this information, it has not been readily available to everyone.

The total consumption of heavy forgings in the country is thought to be far below capacity, the excess in production capacity being put at 30 to 40 per cent. Approximately \$100,000,000 is invested in the heavy forging industry and the average annual profits of the leading forging companies is said to be in recent years less than 5 per cent of the total capital invested.

Officers and Members

The officers of the Forging Manufacturers Association are as follows: S. P. Howe, president Camden Forge Co., Camden, N. J., president; Robert F. Devine, Jr., president Erie Forge

Co., Erie, Pa., and Stuart Hazelwood, vice-president Midvale Co., Philadelphia, vice-presidents; C. W. Heppenstall, president Heppenstall Forge & Knife Co., Pittsburgh, treasurer, and George H. Weiler, Grand Central Terminal, New York, secretary-manager.

The member companies are as follows: Pittsburgh Forge Co., Mesta Machine Co. and Heppenstall Forge & Knife Co., Pittsburgh; Erie Forge Co., Erie, Pa.; Titusville Forge Co., Titusville, Pa.; National Forge & Ordnance Co., Irvine, Pa.; Midvale Co., Philadelphia; A. Finkl & Sons Co., Chicago; J. R. Johnson & Co., Inc., Richmond, Va.; Camden Forge Co., Camden, N. J.; American Locomotive Co., New York, and Cape Ann Anchor & Forge Co., Gloucester, Mass.

Reinforcing Steel

Railroad Bridge Will Require 1700 Tons

AWARDS during the week amounted to 5900 tons, the largest having been 1400 tons for a Government building at Washington. Included in the 5200 tons of new pending work reported was a railroad bridge at San Francisco calling for 1700 tons. Awards follow:

NEW YORK, 700 tons, foundations for Daily News building; from Hegeman Harris Co., Inc., to Carroll-McCreary Co., Inc.

DOVER, N. J., 160 tons, State highway bridge; from A. Guthrie & Co., general contractor, to McClintic-Marshall Co.

LOCK HAVEN, Pa., 250 tons, power house; from John W. Ferguson Co., general contractor, to Faltoute Iron & Steel Co.

WASHINGTON, 1400 tons, Internal Revenue Building, to McClintic-Marshall Co.

GADSDEN, ALA., 150 tons, Goodyear Tire & Rubber Co. plant, to Gulf States Steel Co.

SAN MATEO, FLA., 200 tons, dry kilns for Brooks-Scanlon Corporation, to Connors Steel Co.

CHICAGO, 280 tons, apartment building at 2920 Commonwealth Avenue, to Calumet Steel Co.

CHICAGO, 200 tons, McChesney Building, to Kalman Steel Co.

CHICAGO, 600 tons, Narragansett apartment building, to unnamed bidder.

CHICAGO, 210 tons, Board of Trade Building, to Joseph T. Ryerson & Son, Inc.

MILWAUKEE, 345 tons, for United States Engineer's office, to Kalman Steel Co.

LOS ANGELES, 315 tons, apartment building at 636 Gramercy Place, to unnamed bidder.

LOS ANGELES, 170 tons, apartment building, 1716 North El Cerrito, to unnamed interest.

SAN FRANCISCO, 500 tons, loft building, Clay and Sansome Streets, to Soule Steel Co.

SAN FRANCISCO, 188 tons, hotel, Geary and Shannon Streets, to Concrete Engineering Co.

SAN FRANCISCO, 150 tons, gymnasium, Hayes and Stanyan Streets, to Pacific Coast Steel Co.

SAN FRANCISCO, 250 tons, piles and foundations for San Francisco Stock Exchange Building, to Pacific Coast Steel Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

YONKERS, N. Y., 125 tons, Longfellow High School; Kenneth McKay, Yonkers, general contractor.

OSSINING, N. Y., 100 tons, high school; bids Feb. 17.

JERSEY CITY, 400 tons, ramp garage; previously reported as 200 tons.

PENNSYLVANIA RAILROAD, 875 tons, several bridges.

CHICAGO, 265 tons, junior high school; general contract awarded to Michuda Brothers.

CHICAGO, 275 tons, building for Rusnak Furniture Co.

LAKE FOREST, ILL., 175 tons, two buildings for Ferry Hall.

ROCKFORD, ILL., 100 tons, newspaper building.

MARION, IND., 100 tons, Veterans' Hospital.

SAN FRANCISCO, 105 tons, warehouse, Fifteenth and Bryant Streets; bids being taken.

SAN FRANCISCO, 1700 tons, bridge over Carquinez Straits, Southern Pacific Co.; bids opened.

OAKLAND, 136 tons, apartment building, Lake district; bids being taken.

OAKLAND, 274 tons, warehouse for Port Commission; bids opened.

EMERYVILLE, CAL., 525 tons, plant for Western Electric Co.; bids opened.

ALAMEDA, CAL., 250 tons, boat slip and bulkhead for Bethlehem Shipbuilding Corporation; bids being taken.

French Pipe Interest Forms American Company

That the large French cast iron pipe interest Société Anonyme des Hauts-Fourneaux et Fonderies de Pont-a-Mousson, intends building an American plant in the New England district is confirmed in the announcement by the Herbert Kennedy Co., 475 Fifth Avenue, New York, agent for the United States, that an American company has been incorporated. The new company, the Intercontinental Pipe & Mining Co., with headquarters at 475 Fifth Avenue, New York, has 50,000 shares of no par value. Officers of the company are: Marcel Paul, chairman of the board; Herbert Kennedy, president; Charles Francois, vice-president and treasurer, and Perry A. Hull, secretary. The board of directors consists of Andre Grandpierre and all the officers of the company.

The company holds an option, expiring March 10, on a tract of property in Chelsea, Mass., where, if present plans mature, a cast iron pipe foundry will be erected with an annual capacity of 150,000 tons of gas and water pipe. Dredging a deeper channel and the construction of a dock are also contemplated. It is expected that American pig iron will be used at the proposed foundry. In selecting Chelsea as a site for the plant, the proximity of Mystic furnace at Everett, Mass., was taken into consideration.

Non-Ferrous Metal Markets

Copper Quiet and Firm, Tin Inactive and Easy, Lead Higher and Active, Zinc Unchanged

NEW YORK, Feb. 19.

Copper.—For the first week in some time the market has been, and still is, exceedingly quiet. Foreign consumers are more active than domestic. Yesterday the former bought about 1600 tons and they also bought fairly well today. The total of foreign sales for February is now about 42,000 gross tons. Purchases include deliveries through May, and it is estimated that foreign consumers must still buy more than 91,000 tons to cover their requirements for this month and March, April and May. Producers and, it is believed, also custom smelters have

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY						
	Feb. 19	Feb. 18	Feb. 16	Feb. 15	Feb. 14	Feb. 13
Lake copper, New York.....	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*.....	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.....	49.25	49.12½	49.12½	49.75	49.75	49.62½
Lead, New York.....	6.95	6.85	6.85	6.85	6.85	6.85
Lead, St. Louis.....	6.85	6.75	6.75	6.75	6.75	6.72½
Zinc, New York.....	6.70	6.70	6.70	6.70	6.70	6.70
Zinc, St. Louis.....	6.35	6.35	6.35	6.35	6.35	6.35

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

very little metal left to sell this side of June. Domestic consumers are well covered through May, but each week there are fairly good sales of fill-in lots for various positions. The market is firm and steady, with electrolytic copper quoted at 18c., delivered in the Connecticut Valley, and at 18.25c., c.i.f. European ports. Domestic consumers are inquiring for June metal, but not much has been sold. Lake copper is quiet at 18c. to 18.12½c., delivered. January statistics showed a decrease of about 2500 tons in stocks of refined and blister copper, but in production the output of refined copper was about 7500 tons per day higher than in December. January was the second largest month in the last 13. Production at the mines is on the increase, but the January expansion over December was not large.

Tin.—Due largely to the Lincoln holiday, sales of Straits tin for the

week ended Feb. 16 were the smallest in many weeks, at about 600 tons. Consumers took practically all of this. Dealers are almost entirely out of the market. Sales of standard tin on the exchange were also light, and the week has been very dull. Price changes in Straits tin have been almost nil, ranging between 49.12½c. and 49.25c. The most active day in a long time was yesterday, when 500 tons changed hands, sold almost entirely to consumers. There was a substantial decline yesterday in the London market, with sales here at 49c. to 49.12½c. There were sellers over at the close and more business could have been done. Today the market was very dull, with spot Straits quoted at 49.25c., New York. The active market here yesterday stimulated London today, and against a decline Monday in London of about £3 5s. per ton there was a recovery today of

Metals from New York Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	51.50c. to 52.50c.
Tin, bar.....	53.50c. to 54.50c.
Copper, Lake.....	19.25c.
Copper, electrolytic.....	19.00c.
Copper, casting.....	18.75c.
Zinc, slab.....	7.50c. to 8.00c.
Lead, American pig.....	7.67½c. to 8.12½c.
Lead, bar.....	9.50c. to 10.00c.
Antimony, Asiatic.....	12.00c. to 13.00c.
Aluminum No. 1 ingots for remelting (guar'nt'd over 99% pure).....	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy.....	24.00c. to 25.00c.
Babbitt metal, commerc'l grade.....	30.00c. to 40.00c.
Solder, ½ and ½.....	32.50c. to 33.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	54.75c.
Tin, bar.....	56.75c.
Copper, Lake.....	19.38c.
Copper, electrolytic.....	19.38c.
Copper, casting.....	18.13c.
Zinc, slab.....	8.00c.
Lead, American pig.....	7.50c. to 7.60c.
Lead, bar.....	9.75c.
Antimony, Asiatic.....	16.00c.
Babbitt metal, medium grade.....	19.50c.
Babbitt metal, high grade.....	60.25c.
Solder, ½ and ½.....	34.00c.

Rolled Metals from New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass.....	21.62½c.
Copper, hot rolled.....	26.37½c.
Copper, cold rolled, 14 oz. and heavier.....	27.62½c.
Seamless Tubes—	
Brass.....	26.50c.
Copper.....	27.37½c.
Brazed Brass Tubes.....	29.62½c.
Brass Rods.....	19.37½c.

From New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), oaks.....	10.00c. to 10.50c.
Zinc sheets, open.....	11.00c. to 11.50c.

Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products have not been changed since Feb. 8, and lead full sheets and zinc sheets are still being quoted at the advances established Jan. 7 and July 30, 1928, respectively.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—	
High brass.....	22.50c.
Copper, hot rolled.....	27.37½c.
Zinc.....	9.75c.
Lead (full sheets).....	10.50c. to 10.75c.
Seamless Tubes—	
High brass.....	27.37½c.
Copper.....	28.37½c.

Rods—	
High brass.....	20.25c.
Naval brass.....	22.25c.

Wire—	
Copper.....	19.87½c.
High brass.....	23.00c.
Copper in Rolls.....	26.37½c.
Brazed Brass Tubing.....	30.50c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide.....	
	33.00c.
Tubes, base.....	
	42.00c.
Machine rods.....	
	34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	14.75c.	16.00c.
Copper, hvy. and wire.....	14.25c.	15.50c.
Copper, light and bottoms.....	12.50c.	14.00c.
Brass, heavy.....	8.00c.	9.00c.
Brass, light.....	7.00c.	8.00c.
Hvy. machine composition.....	11.50c.	13.00c.
No. 1 yel. brass turnings.....	9.50c.	10.25c.
No. 1 red brass or compos. turnings.....	11.00c.	11.75c.
Lead, heavy.....	5.25c.	5.75c.
Lead, tea.....	3.75c.	4.25c.
Zinc.....	3.25c.	3.75c.
Sheet aluminum.....	13.50c.	15.50c.
Cast aluminum.....	12.00c.	14.00c.

Rolled Metals, f.o.b. Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	
	Base per Lb.
High brass.....	22.50c.
Copper, hot rolled.....	27.62½c.
Copper, cold rolled, 14 oz. and heavier.....	29.82½c.
Zinc.....	10.00c.
Lead, wide.....	10.55c.
Seamless Tubes—	
Brass.....	27.37½c.
Copper.....	28.37½c.
Brass Rods.....	20.25c.
Brazed Brass Tubes.....	30.50c.

about £2 5s. Prices there today were £223 for spot standard, £223 15s. for future standard and £228 5s. for spot Straits. The Singapore price today was £225 17s. 6d. Deliveries into consumption for February are estimated at about 7500 tons.

Lead.—Another advance by the leading interest was made this morning from 6.85c. to 6.95c., New York, as the contract price. Prices at St. Louis also advanced from 6.75c. to 6.85c. Buying has been quite heavy, with March the principal delivery involved.

Zinc.—Chief interest centers in the advance last week in ore prices at Joplin, from \$40 to \$41 per ton. This is the first advance since last August and has been expected for several weeks. The week's production was about 11,500 tons and sales of 12,400 tons were reported, with shipments for the week about 11,350 tons. Stocks are estimated at about 20,500 tons. It has been expected that an advance in ore would be reflected in the price of prime Western. This has not yet materialized and the market is firm and steady at 6.35c., East St. Louis, or 6.70c., New York. Consumers have not been moved to increase their purchases as yet, but more activity and perhaps higher prices are looked for in the near future. Buying has been only moderate the past week.

Antimony.—Despite the absence of cable offerings from China, the market is firm and buying is fair. Chinese metal is quoted at 9.62½c. for spot and 9.75c. for futures, New York, duty paid.

Nickel.—Ingot and shot nickel in wholesale lots are quoted at 35c. and 36c. respectively. Cathodes of electrolytic nickel are obtainable on the same basis as ingot and shot nickel.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, Feb. 19.—Sales in this market are in good volume and prices, with the exception of tin, are strong. Quotations for lead are higher. The old metal market is steady and prices are unchanged.

Prices, per lb., in carload lots: Lake copper, 17.87½c.; tin, 49.75c.; lead, 6.85c.; zinc, 6.45c.; in-less-than-carload lots: antimony, 10.50c. On old metals we quote copper wire, crucible shapes and copper clips, 14.50c.; copper bottoms, 13c.; red brass, 12.75c.; yellow brass, 9.50c.; lead pipe, 5.50c.; zinc, 3.50c.; pewter, No. 1, 27.50c.; tin foil, 27.50c.; block tin, 40c.; aluminum, 12.75c.; all being dealers' prices for less-than-carload lots.

Fabricated Structural Steel

Department of Commerce Building at Washington Will Take 20,000 Tons—Awards of 24,500 Tons

WITH a building for the Department of Commerce in Washington calling for 20,000 tons, new projects reported during the last week amounted to 54,800 tons, more than twice the total of awards, which was 24,500 tons. Other large inquiries were a railroad shop at Huntington, W. Va., which will take 6000 tons, a New York hotel, calling for 5000 tons, and an office building at Newark, N. J., which will require 4000 tons. Awards, which follow, included no projects of outstanding size.

STATE OF VERMONT, 130 tons, two bridges to Berlin Construction Co., and one bridge to unnamed fabricator.

BOSTON, 350 tons, Atlantic National Bank

Building, to Boston Bridge Works, Inc. PITTSFIELD, MASS., 300 tons, addition to Hotel Wendel, to Palmer Steel Co.

NEW YORK, 3000 tons, loft building at Eighth Avenue and Thirty-fifth Street, to Hedden Iron Construction Co.

NEW YORK, 500 tons, apartment building at 111 East Eighty-eighth Street, to George A. Just Co.

LEHIGH VALLEY RAILROAD, 300 tons, bridge, to Bethlehem Steel Co.

PHILADELPHIA, 1500 tons, building for Aldine Trust Co., to McClintic-Marshall Co.

BIRMINGHAM, 3200 tons, plant for Pullman Car & Mfg. Co., to Ingalls Iron Works.

SAVANNAH, GA., 600 tons, bridges for Central of Georgia Railway, to Virginia Bridge & Iron Co.

JACKSONVILLE, FLA., 600 tons, bridge for city, to Virginia Bridge & Iron Co.

NEW ORLEANS, 130 tons, conveying system for American Sugar Refining Co., to St. Louis Structural Steel Co.

MEMPHIS, TENN., 1600 tons, Murray Body Corporation, to Virginia Bridge & Iron Co.

PITTSBURGH, 3200 tons, bridge for city of Pittsburgh, to Independent Bridge Co.

ERIE, PA., 170 tons, Presbyterian Church, to Pittsburgh Bridge & Iron Co.

JACKSON, MICH., 250 tons, building for Austin Co., to Guilbert Steel Co.

FORT WAYNE, IND., 600 tons, building for Steinite Radio Corporation, to Rochester Bridge Co., Rochester, Ind.

CHICAGO, 250 tons, bridge for Chicago & North Western, to Wisconsin Bridge Co.

CHICAGO, 170 tons, miscellaneous public utility work, to Vierling Steel Works, local.

CHICAGO, 800 tons, addition to Lawyers' Building, to Mississippi Valley Structural Steel Co.

CHICAGO, 115 tons, caisson rings for McClesney Building, to Joseph T. Ryerson & Son, Inc.

EAST ST. LOUIS, ILL., 100 tons, three tug boats for United States Engineers, to St. Louis Structural Steel Co.

MONSANTO, ILL., 100 tons, for Evans-Wallower Lead Co., to St. Louis Structural Steel Co.

WAYNOKA, OKLA., 250 tons, airplane hangar, to Mississippi Valley Structural Steel Co.

SEATTLE, 250 tons plates, motorship for Foshay Co., to Lake Washington Shipyards.

SEATTLE, 750 tons, St. Marks Cathedral, to Wallace Bridge & Structural Steel Co.

SEATTLE, 160 tons, Rainier Club addition,

to Wallace Bridge & Structural Steel Co.

VICTORIA, B. C., 2500 tons, addition to Empress Hotel, to Dominion Bridge Co.

SAN FRANCISCO, 160 tons, apartment building, Herman and Buchanan Streets, to Golden Gate Iron Works.

SAN FRANCISCO, 1500 tons, San Francisco Stock Exchange Building, to Dyer Brothers.

LOS ANGELES, 1100 tons, factory for Samson Tire & Rubber Co., to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BROOKLINE, MASS., 120 tons, Country Club indoor tennis courts.

NEW YORK, approximately 5000 tons, Pierre Hotel at Fifth Avenue and Sixty-first Street.

NEW YORK, tonnage being estimated, Down Town Athletic Club at 18-20 West Street; Thompson-Starrett Co., general contractor.

NEW YORK, 1100 tons, Lawyers Club at 16-18 Vesey Street; Cass Gilbert, architect.

NEW YORK, 500 tons, building for Renaw Realty Co. in West Forty-fourth Street.

BROOKLYN, 500 tons, bakery building in Williamsburg section for General Baking Co.

NEWARK, 4000 tons, Lefcourt office building in Market Plaza.

WASHINGTON, 20,000 tons, Department of Commerce Building; bids March 27.

HUNTINGTON, W. VA., 6000 tons, extensions to Chesapeake & Ohio railroad shops at Huntington and Russell, Ky.

BIRMINGHAM, 2300 tons, Jefferson County Courthouse.

ERIE, PA., 700 tons, theater for Warner Brothers.

NEW YORK CENTRAL RAILROAD, 375 tons, grade crossing elimination at Lackawanna, N. Y.

BUFFALO, 330 tons, Burgard Vocational School (refigured).

BUFFALO, 200 tons, new hotel.

WINDSOR, ONT., 600 tons, office building for Merlo, Merlo & Ray, Ltd.

EAST YORK TOWNSHIP, ONT., 125 tons, school.

KITCHENER, ONT., 100 tons, business block for C. B. Schmaltz, 99 College Street.

DETROIT, 200 tons, office building for Wabash Railroad.

CLEVELAND, 1000 tons, three bridges for Nickel Plate Road.

CLEVELAND, 200 tons, warehouse for Otis Steel Co.

CHICAGO, tonnage not stated, addition to Hall Printing Co. plant.

CHICAGO, 1200 tons, additional stories to Illinois Bell Telephone Co. building.

IOWA CITY, IOWA, 1500 tons, stadium for University of Iowa.

ST. LOUIS, 500 tons, additions and alterations to Union Station.

BLACKBURN, NEV., 2000 tons, building for Eureka Smelting Co.

LONG BEACH, CAL., 3000 tons, Ford assembly plant.

LONG BEACH, 1936 tons, sheet piling; bids opened.

LOS ANGELES, 250 tons, stage for Paramount Famous Lasky Co.; bids being taken.

LOS ANGELES, 225 tons, steel joists, factory for Samson Tire & Rubber Co.; bids being taken.

SAN FRANCISCO, 600 tons, apartment building, Clay and Jones Streets; bids being taken.

OAKLAND, 200 tons, apartment building, Lake and Madison Streets; Moore Dry Dock Co., low bidder.

EMERYVILLE, CAL., 250 tons, plant for Western Electric Co.; bids opened.

PERSONAL

JAMES J. CURRAN, for many years metallurgist for the Henry Souther Engineering Co., Hartford, Conn., is now metallurgical engineer with the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa. He was born at New Britain, Conn., and attended Worcester Polytechnic Institute and Cornell University. During the war he was employed as chemist and metallurgical inspector of war materials. Since the war he has been engaged in general metallurgical in-



J. J. CURRAN

vestigation and consultation with the Souther company. In his new connection Mr. Curran will be in charge of chemical and metallurgical control and development of the varied line of carbon and alloy steels, hydraulic and drop forgings and drawn seamless cylinder specialties manufactured by the Harrisburg company. He is a member of the American Society for Steel Treating, the American Foundrymen's Association and the Iron and Steel Institute (British).

VERNON W. WELLS, Carborundum Co., Niagara Falls, N. Y., spoke before the Milwaukee Association of Purchasing Agents on Feb. 12, his subject having been the growth of the abrasive industry.

L. P. ROBINSON, general sales manager Werner G. Smith Co., Cleveland, spoke before the Philadelphia Foundrymen's Association, Feb. 13, on "What Has Become of the Foundryman's Share of the American Dollar?"

JAMES A. MUIR, until recently sales engineer for the Thomson Electric Welding Co., Lynn, Mass., has been appointed assistant to the president of the Taylor-Winfield Corporation, Warren, Ohio, maker of electric welding machines. He has been identified with the welding industry for

25 years and was one of the founders of the old Toledo Electric Welder Co., which was absorbed by the Thomson company. Mr. Muir will have charge of customer contact through the various service and sales offices, and his appointment will allow A. C. TAYLOR, president of the company, to devote more time to engineering and development work.

ROBERT W. HEERLEIN has been elected president and treasurer of the Flint Structural Steel Co., Flint, Mich.; **E. H. PERKINS**, vice-president and secretary, and **E. M. CHRISTENSEN**, chief engineer.

CHARLES E. VAN NORMAN has been made treasurer of the Van Norman Machine Tool Co., Springfield, Mass., succeeding the late Frank H. Page. Mr. Van Norman is also president of the company.

SAMUEL M. HASTINGS, president of the Dayton Scale Co., Chicago, has resigned the presidency of the Illinois Manufacturers' Mutual Casualty Association, an auxiliary of the Illinois Manufacturers' Association.

C. M. TAYLOR has been appointed sales manager of the Lincoln Electric Co., Cleveland, manufacturer of motors and arc welding equipment. He has been factory manager of the com-



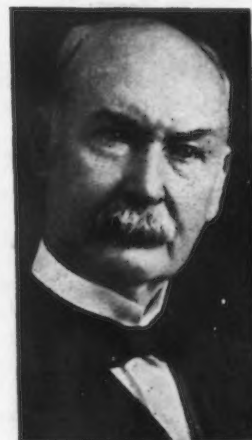
C. M. TAYLOR

pany since 1923. After his graduation from Western Reserve University in 1916 he entered the employ of the company and later was made foreman of the assembly and testing departments. In 1917 he enlisted in the United States Army and spent two years in the Army Air Corps. Upon his return to the Lincoln company, he was made time study demonstrator and observer. He has been vice-president of the company since 1925.

M. TSUTSUMI, general manager of of the San Francisco office of Mitsui & Co., Tokyo, Japan, iron and steel exporters and importers, has been appointed assistant general manager of the New York office of the company at 65 Broadway, succeeding T. Ukai, who died Jan. 4. **T. KOBAYASHI**, assistant manager in the Osaka, Japan, office of the company succeeds Mr. Tsutsumi as manager in San Francisco.

E. T. WEIR, president Weirton Steel Co., Weirton, W. Va., sailed on Feb. 16, for a vacation at Nassau, B. W. I.

THOMAS A. DOOLEY, St. Louis district manager of the American Car



T. A. DOOLEY

& Foundry Co., New York, was honored by the company's officers with a jubilee dinner at the Chase Hotel, St. Louis, on Feb. 16, in celebration of his fiftieth year of service at the St. Louis plant. During that time the plant, largely under his management, has grown to be one of St. Louis' greatest industries, having built in one month 2250 freight cars, an output said to have been unequaled by any single plant of any other equipment builder. Mr. Dooley was born in Cincinnati, and came to St. Louis early in life, where he has spent his entire business career. Two hundred persons attended the dinner, at which **NICHOLAS A. DOYLE**, vice-president, presided.

WILLARD S. HARING, who has been general manager of sales of the Alan Wood Iron & Steel Co. for the past four years, prior to which he was, for a number of years, assistant sales manager, has been reappointed general manager of sales in the new Alan Wood Co., and will make his headquarters at Ivy Rock, Pa., when the main office is removed from Philadelphia.

C. A. REED has resigned as Pittsburgh district sales manager Erie City Iron Works, Erie, Pa., to become chief combustion engineer of the Pittsburgh Coal Co., Pittsburgh, in

which capacity he will have charge of servicing on coal sales. Mr. Reed was with the International Combustion Engineering Corporation, New York, for eight years prior to joining the Erie City Iron Works two years ago.

WILLIAM B. PRESCOTT has been named manager of domestic coal sales of the Koppers Coal Co., Pittsburgh, a subsidiary of the Koppers Co. Mr. Prescott for a number of years was in charge of coal purchases of the Youngstown Sheet & Tube Co. and later became manager of the raw materials department of that company. Before making that connection he was coal sales representative in Pittsburgh of B. Nicoll & Co., New York.

E. T. CAUSER, formerly president of Atlas Mfg. Co., Fostoria, Ohio, and works manager of the Chandler-Cleveland Motors Corporation, Cleveland, has been appointed general manager crankshaft division of the Union Drawn Steel Co., Beaver Falls, Pa.



E. T. CAUSER

Prior to his connection with the Chandler corporation, Mr. Causer was associated for seven years with Driggs-Seabury Ordnance Corporation, was superintendent of the Mitchell-Lewis Motor Co., Racine, Wis., for three years, and was works manager of the R. D. Nuttall Co., Pittsburgh, for four years. In 1919 he became associated with Nordyke-Marmon Co., Indianapolis, as assistant factory manager, and in 1920 was appointed general superintendent in charge of manufacturing, holding the position until 1923, when he went to Chandler corporation as assistant to J. R. Hall, vice-president in charge of manufacturing. Later he was given charge of all manufacturing operations and made president of Atlas company, a Chandler subsidiary. He is a member of the executive committee of the National Metal Trades Association of the Cleveland district.

H. B. GUEST, formerly in the Birmingham office of the American Cast Iron Pipe Co., has been transferred to

the Chicago office, and F. W. McMEANS, formerly at Chicago, will make his headquarters in Detroit.

S. D. WRIGHT, vice-president and general manager of the Atlas Car & Mfg. Co., Cleveland, has been elected president of the American Plan Association, Cleveland. Other officers are Thomas Ferry, president Ferry Cap & Set Screw Co., Cleveland, vice-president; and W. L. Seelbach, secretary Forest City-Walworth Run Foundry Co., treasurer. The board of governors includes P. E. Bliss, president Warner & Swasey Co.; G. E. Randles, president Foote-Burt Co.; George S. Case, treasurer Lamson-Sessions Co.; Jacob D. Cox, Jr., president Cleveland Twist Drill Co.; F. R. Fishback, president Electric Controller & Mfg. Co.; F. G. Hodel, president Chain Products Co.; R. W. Kaltenbach, president McMyler-Interstate Co.; E. H. Parkhurst, vice-president Columbia Axle Co.; L. R. Scaff, general manager Fisher Body Ohio Co., all of Cleveland.

EDWIN C. ALFORD has been appointed district engineer in the New York territory for the Struthers-Wells Co., Warren, Pa. He was at one time chemical engineer and later assistant sales manager of T. Shriver & Co., Harrison, N. J., and was for several years New York sales manager of the Duriron Co., Dayton, Ohio. Recently he has been a manufacturers' representative in New Jersey for several manufacturers of chrome iron and other alloy fittings, valves, pumps and general process equipment.

ARTHUR PURNELL, for two years district sales agent at Pittsburgh for the Youngstown Sheet & Tube Co., has been appointed district sales agent at Chicago, succeeding B. T. BECHTEL, whose death was reported in the Feb. 7 issue of THE IRON AGE. Mr. Purnell joined the Youngstown company's organization at Youngstown 23 years ago. He was assistant district manager in the New York office for eight years and then was transferred to Boston, where he remained for four and one-half years as district sales agent. His next move was to Pittsburgh.

LUTHER BECKER, chief of the Iron and Steel Division, Department of Commerce, Washington, has returned from Del Monte, Cal., where he attended the meeting of the Iron, Steel and Allied Industries of California.

EDWARD MANHARD, vice-president Rock Island Bridge & Iron Works, Rock Island, Ill., has been elected president of the company, succeeding WALTER A. ROSENFELD, who has been named chairman of the board. Mr. Manhard has been acting head of the company since Mr. Rosenfeld's partial retirement six years ago. H. A. KNEISLEY has been elected vice-president; W. G. MURPHY, secretary, and M. S. CARLSON, treasurer.

Washington Award Made to B. J. Arnold

The Washington Award for 1929 will be presented to Bion Joseph Arnold, Chicago consulting engineer on electric railroad practice, at a dinner to be held at the Palmer House, Chicago, on Feb. 21. The award, which was founded by John Watson Alvord "for pre-eminent service in promoting the public welfare," is administered by the Western Society of Engineers. Mr. Arnold is a past-president of that society and of the American Institute of Electrical Engineers and was one of the pioneers in the development of the elevated electric railroad.

To Discuss Handling and Production

Automobile production will feature a four-day meeting of the American Society of Mechanical Engineers, to be held in Detroit May 1 to 4. The program calls for a discussion of materials handling in the various shops and departments of the automotive industry, and a complete analysis of the production management phases of that industry.

The meeting is sponsored jointly by the Management Division and the Materials Handling Division of the society. Numerous local engineering and other organizations are backing the meeting and will be represented on the list of papers for discussion.

As the program has been outlined, the sheet metal shops, forge shops, foundries, miscellaneous parts departments, body building, hood and fender and machine shops will have their problems outlined and discussed, following which the general assembly, including materials control of the assembly line, the work in the assembly line, and finally the production of the finished article will be dealt with. Application of the methods of the automotive industry to other industries will be outlined, including particularly electrical manufacturing, baking, furniture and miscellaneous items such as cash registers, food products, adding machines, typewriters, etc.

Inspection trips to various automotive plants are planned, and trips may be arranged to other plants. Those on the regular program include the Ford River Rouge plant and the Hudson, Chrysler, Dodge, Oakland, Packard and Cadillac works, and the Chevrolet forge plant, as well as the Wilson Foundry in Pontiac, Mich.

Will Build Two New Ships

WASHINGTON, Feb. 19.—The sale by the Shipping Board of the United States Lines and American Merchant Marine Lines to P. W. Chapman Co., Inc., involves the provision that the purchaser shall build two new fast vessels of at least 45,000 tons. The new ships will be built with the aid of the board's construction loan fund.

OBITUARY

DELAMER E. CLAPP, president E. D. Clapp Mfg. Co., Auburn, N. Y., who died in Auburn on Feb. 11, was born Nov. 9, 1849, and was graduated from Andover Academy in 1866, and from Yale University in 1870. After several years of service with the Hartford *Courant*, under Charles Dudley



D. E. CLAPP

Warner, he spent a year abroad studying at Vienna, Berlin and Hanover. In 1875 he gave up his newspaper career to become associated with his father, E. D. Clapp, as secretary of the E. D. Clapp Mfg. Co., which had been founded in 1864. He had been president of that company since 1890. In a letter which Mr. Clapp wrote to *THE IRON AGE* some years ago, he stated that he had been an advertiser in *THE IRON AGE* for 40 years and since January, 1888, every number has contained a small advertisement of his company. He attributed much of the success of his business "to the introduction secured for us to a most desirable clientele through the publicity given us by *THE IRON AGE*." Mr. Clapp's oldest son, E. D. Clapp, is vice-president and treasurer of the E. D. Clapp Mfg. Co. Another son, Edward A. Clapp, is treasurer of the Pyrene Mfg. Co., Newark, N. J.

WILLIAM T. MCCREAVY, president Schuylkill Forge Co., Third and Luzerne Streets, Philadelphia, died on Feb. 11 in a Philadelphia hospital, after a month's illness. He had been president of the Schuylkill Company since its formation in 1907. A son, William A. McCreavy, is vice-president and treasurer of the company.

MATTHEW GRISWOLD, who retired as manager of the Erie, Pa., works of the General Electric Co., on Jan. 1, because of ill health, died at his home in Erie on Feb. 10. He was born in that city in 1866 and was graduated

from the Sheffield Scientific School of Yale University in 1888. After two years of post-graduate work he obtained the M. E. degree, and upon leaving college, became associated with the Griswold Mfg. Co., of which he served as president for a number of years. He left the Griswold company in 1911 to become acting manager of the Erie works of the General Electric Co., and was made manager of the plant on Dec. 12, 1912.

RAPHAEL ECCLETON GALLAHER, president of the New York Insulated Wire Co., New York, died at his residence in that city on Feb. 10, aged 78 years. He was a pioneer in the wire and cable industry, having organized the New York company in 1884 and having served as its secretary until 1927, when he was made president. Mr. Gallaher had been active in the affairs of the wire and cable section of the National Electrical Manufacturers Association.

ROBERT P. SMITH, president of Smith, Drum & Co., Allegheny Avenue and Fifth Street, Philadelphia, machinery dealers, died suddenly on Feb. 10 at Hollywood Beach, Fla., where he had gone to participate in a golf tournament. He was 62 years of age.

W. W. WAINWRIGHT, founder of the Wainwright Engineering Corporation, Connersville, Ind., which later was merged with the McQuay-Norris Mfg. Co., St. Louis, died recently at his home in Connersville, aged 74 years. He had retired from active business some years ago to devote his time to scientific and historical research.

ED ELSON, president of the Elson Fuld Railway Equipment Co., owner of the Henry Benjamin Equipment Co., St. Louis, died suddenly at his home in that city on Feb. 16, aged 49 years. He was born at Meridian, Miss., and went to St. Louis in 1899 to become associated with the Walter A. Zelnicker Supply Co., of which he served as vice-president for many years prior to the formation of the Elson Fuld company.

GUSTAVE F. HONOLD, president Globe Co., Sheboygan, Wis., maker of metal stampings, died suddenly in a hotel in New York on Feb. 12. He was born in Germany in 1871 and came to America in 1881. Mr. Honold established the Honold Mfg. Co. in 1903 to manufacture undertakers' devices, and later acquired the Globe Foundry & Machine Co., now the Globe Co. He also was president of the Wisconsin Castings Co., Sheboygan.

ERICH R. LADISH, a director of the Ladish Drop Forge Co., Milwaukee,

died Feb. 9 after an illness of two months. He was born in Milwaukee in 1874 and was a brother of Herman W. Ladish, president, and Frank A. Ladish, vice-president and general manager, of the company.

BENJAMIN L. SOMMER, chairman of the board of the Keystone Steel & Wire Co., Peoria, Ill., and president of the Mid-States Steel & Wire Co., Crawfordsville, Ind., died on Feb. 8, at his winter home at Coral Gables, Fla., aged 49 years. He was the son of Peter Sommer, founder of the Keystone company, and began his career in the industry as a spooler in the small plant at Tremont, Ill., which was removed to Peoria in 1895. Prior to his election as chairman of the company in April, 1928, he had served as president for many years. Last year he was associated with his brother, the late John Sommer, in the organization of the Mid-States company, which was formed by a merger of the Crawfordsville Wire & Nail Co., Crawfordsville, Ind.; the Dwiggins Wire Fence Co., Anderson, Ind., and the Adrian Fence Co., Adrian, Mich. He became president of that company after the death of his brother, which occurred a short time after the company was formed. Another brother, William H. Sommer, is president of the Keystone company.

Wholesale Prices Are Slightly Higher

Advance of a fraction of a point in wholesale prices in January is reported by the United States Bureau of Labor Statistics. The index number is 97.2, compared with 96.7 in December and 96.3 in January, 1928. Farm products showed the most substantial gain, from 103.6 to 105.9, all figures being based on the 1926 average as 100.

Metals and metal products advanced from 102.9 to 103.6, owing mainly to the increase in non-ferrous metals to 100.7 from 98. Iron and steel at 96.7 showed a gain from 96.6; automobiles went up from 111.2 to 111.6, and agricultural implements, at 98.8, showed no change.

Largest Aliquippa Blast Furnace Now Blowing

The performance of the No. 4 Aliquippa blast furnace of the Jones & Laughlin Steel Corporation, Pittsburgh, which was recently blown in, is being watched with interest by all who operate blast furnaces. This stack has a hearth about 26 ft. in diameter and a bosh of about 28 ft., the largest in any blast furnace in this country. No. 5 furnace of the same group, with bosh and hearth diameters about 2 ft. less than those of No. 4 furnace, had a daily average output in 1928 of more than 1000 tons.

More Than \$262,000,000 of Steel Exported

Gain of 12 Per Cent Over 1928 Well Distributed Among Major Iron and Steel Products

EXPORTS of iron and steel products from the United States, under three main headings used by the Department of Commerce (Semi-manufactures, Manufactures and Advanced Manufactures) amounted in 1928 to \$262,212,325, representing a gain of 12.1 per cent over the \$233,877,571 of 1927. As shown in the table, the gains of all three groups were approximately uniform.

Two other tables detail the main items under semi-manufactures and manufactures (as one group) and

advanced manufactures. Under the latter head gains were recorded in all but one of the eight items listed. Under the former, only five items showed losses, against 18 with gains.

Principal Iron and Steel Exports from United States

(In Thousands of Dollars)

	1928	1927
Tin and terne plate.....	\$26,317	\$29,062
Structural, total.....	17,697	13,245
Sheets, black.....	15,210	13,851
Sheets, galvanized.....	14,664	15,498
Casing and oil-line pipe.....	11,399	9,318
Welded black pipe.....	6,324	7,856
Welded galvanized pipe.....	3,303	4,384
Boiler tube.....	2,301	1,741
Pipe fittings.....	6,246	6,522
Steel bars.....	9,114	6,939
Steel bars, alloy.....	1,487	916
Plates.....	8,400	7,024
Rails.....	6,926	6,783
Rail fastenings.....	3,483	3,155
Wire, plain and galv.....	3,467	2,843
Wire, barbed.....	4,377	3,156
Wire, other, ex-nails.....	5,204	4,860
Nails, tacks, staples.....	2,640	2,418
Strip, hoops, bands, scroll	3,979	3,061
Castings and forgings.....	7,759	5,352
Skelp.....	5,384	3,952
Pig iron.....	1,367	1,028
Scrap.....	6,615	3,765

Exports of Advanced Manufactures (In Thousands of Dollars)

	1928	1927
Hand tools.....	\$17,474	\$16,481
Cutlery.....	12,980	10,232
Hardware.....	8,502	7,820
Metal furniture and fixtures.....	8,057	6,934
Stoves and furnaces (not electric).....	5,374	4,128
Hollow and enameled ware.....	3,736	3,183
Chains.....	2,478	2,513
Scales and balances.....	2,380	2,325

Exports of Iron and Steel Products from United States

Group	1928	1927	Gain, Per Cent
Semi-manufactures.....	\$95,993,155	\$86,717,051	10.7
Manufactures.....	83,661,545	73,829,922	13.3
Advanced manufactures.....	82,557,625	73,330,598	12.6
Total.....	\$262,212,325	\$233,877,571	12.1

New York Factory Earnings at Highest Point

Average weekly earnings in representative factories in New York State, as reported by the State Industrial Commissioner, were \$30.12 in December. This is the first time they have been past the \$30 mark, the previous maximum having been that for March, 1927, equaled in October, 1928, at \$29.78 a week. The December figure compares with \$29.62 in the preceding month and with \$29.57 in December, 1927.

Not only the monthly figure but the average for the year made a new high record in 1928. The yearly average was \$29.44, compared with previous record averages of \$29.30 in 1927 and \$29.02 in 1926.

Commercial Stocks of Bituminous Coal

Stocks of bituminous coal in the hands of commercial consumers in the United States are estimated as of Jan. 1, by the Bureau of Mines, at 41,800,000 net tons. This is about the same as the figures for Nov. 1, Oct. 1 and July 1, 1928, but is lower than other quarterly figures quoted since the summer of 1926.

Compared with a year earlier the trend of consumption is shown by means of combined figures for November and December. By-product coke plants have shown an increase of

18.2 per cent; beehive coke plants, of 7.6 per cent; electric utilities, of 4.1 per cent; steel plants, of 2.8 per cent and locomotives, of 1.6 per cent. Only one decrease is shown—2.4 per cent—for retail yards in cities.

Less Trackwork Produced in January

Production of trackwork for T-rail track of 60 lb. and up, as reported by the American Iron and Steel Institute, was 9996 tons in January. This is a reduction of about 10 per cent from the 11,061 tons reported for December, but otherwise it was the highest monthly total since September. Only three months last year, however, were smaller than the current figure, one of them being January, with 9332 tons. The monthly average last year was 11,637 tons.

Immigration in Last Half of 1928

WASHINGTON, Feb. 19. — Immigrants to the number of 147,707 entered the United States during the last six months of 1928, while the number of emigrants was 44,677, making a net increase of 103,030 in favor of the incoming movement. Of the immigrants, 78,748 came from Europe, Germany leading with 21,758. Immigration from the Americas totaled 66,181, Canada providing 34,993

and Mexico 25,020. Immigration in December amounted to 18,357 while there were 8264 emigrants.

There were 682 iron and steel workers, 691 machinists and 167 metal workers included in the number of immigrants entering the United States from July to December of last year, while the number of emigrants in the same period in these classes were 111 iron and steel workers, 304 machinists and 12 metal workers.

Sales of Mechanical Stokers Smaller

Mechanical stokers sold in January, as reported by the Department of Commerce, numbered 97 units, aggregating 42,392 hp. This shows a reduction from the 102 units and 49,212 hp. of December, although it is considerably better than the figures for January, 1928, at 75 units and 26,572 hp. The current January figure is practically identical in hp. rating with the average month of 1928, and is slightly higher than the average of 1927.

Seasonal Production of Portland Cement

Production of Portland cement in January is reported by the United States Bureau of Mines at 9,781,000 bbl., compared with 9,768,000 bbl. a year earlier and with 12,189,000 bbl. in December. The figure reflects the season restriction of output through the winter. Customarily the January, February and March totals are the smallest of the year.

Shipments in January were 5,735,000 bbl., which is a smaller total than that for any month of last year. January, 1928, showed 6,541,000 bbl. as the year's minimum. As a result of the small shipments, there was an addition of more than 4,000,000 bbl. to stocks during January, the total reaching 26,696,000 bbl. at the end of the month, compared with 25,116,000 bbl. a year earlier.

Petroleum Output Slightly Less in 1928

Total production of petroleum last year is reported by the United States Bureau of Mines at 900,364,000 bbl., compared with 901,129,000 bbl. in 1927. Of the total, light crude oil, at 806,534,000 bbl. in 1928, showed a gain of more than 2 per cent over 1927, while heavy crude oil, at 93,830,000 bbl., recorded a drop of about 16 per cent.

Texas led as a producing State in 1928, with an output of 256,888,000 bbl. Oklahoma was in second position, with 249,558,000 bbl. California stood third, with 231,982,000 bbl. No other State reached 40,000,000 bbl. Texas showed an increase of about 18 per cent over 1927 and advanced from third position that year.

Machinery Markets and News of the Works

Sales Holding at High Level

Machine Tool Business Active—Hupp Motor Car Corporation Buys 37 Tools—General Electric Co. Inquiries for 75

WITH orders for 37 machine tools from the Hupp Motor Car Corporation, Cleveland, and inquiries from the General Electric Co., Schenectady, N. Y., for about 75 machines, together with a widely diversified demand for single machines, the machine tool business of the past week was exceedingly active. The volume of inquiry now pending forecasts a continuance of the present volume of buying through next month, at least.

The Hupp corporation's purchases were for Atlas Mfg. Co., Fostoria, Ohio, a subsidiary of the Chandler-Cleveland Motors Corporation, which the Hupp corporation recently acquired. The Hupp corporation, it is announced, will manufacture a line of popular-priced cars in the Cleveland plants of Chandler-Cleveland, and purchases of equipment for those plants are expected.

Most of the tools inquired for by the General Electric Co. are for its radio and refrigerator departments at Schenectady, although a few are for

shipment to the Pittsfield, Mass., works.

Further inquiries for railroad tools have appeared in the Chicago market, coming from the Santa Fe, Rock Island and an Indiana road. The New York Central has bought two radial drills.

Export buying is in fairly good volume. A French automobile manufacturer has ordered a number of special lathes. Pending business from Russia is of substantial proportions.

The National Machine Tool Builders' Association, in its report on January sales, records a slight gain over December business. Thus, January is the ninth consecutive month in which unfilled machine tool orders have shown an increase. The present ratio of unfilled orders to shipments at 2.65 indicates, says the association, that orders are being taken for almost three months' delivery, in spite of the fact that shipments have been climbing steadily since June in an effort to keep up with orders.

New York

NEW YORK, Feb. 19.—The General Electric Co. has issued inquiries for about 75 machine tools for its Schenectady and Pittsfield plants. The bulk of the equipment is for the radio and electric refrigerator departments at the Schenectady works. Standard machines such as lathes, milling machines, turret lathes, shapers, etc., make up a large part of the requirements.

The local machine tool trade is quoting on a great deal of miscellaneous equipment from manufacturers in nearly all industries. Although many of the inquiries are for single machines, the total is large and promises to make the first three months of this year one of the best quarterly periods on record. February business has been good, and for many sellers may surpass that of January. As much of the current inquiry will not be closed until March, it follows that the third month of the quarter is likely to keep up the pace which the first two months have set. Railroad buying is light. The New York Central has ordered two 3-ft. radial drills.

Bids have been asked on general contract by Famous Players-Lasky Corporation, Paramount Building, 1501 Broadway, New York, for two-story machine shop at Long Island City studio, with part to be used as woodworking shop, to cost about \$100,000 with equipment. C. C. Hamilton is company architect, address noted.

Palmer Brothers, Inc., 112 Front Street, Brooklyn, manufacturer of electric appliances and equipment, plans rebuilding part of six-story factory destroyed by fire Feb. 14.

M. J. Ort, 424 East 149th Street, New York, architect, has plans for six-story automobile service, repair and garage building, 100 x 150 ft., to cost over \$150,000.

Manhattan Perforated Metal Co., 305 East Forty-fifth Street, New York, has purchased a factory on Hulst Avenue, Long Island City, for new plant, for increased capacity.

National Biscuit Co., 85 Ninth Avenue, New York, has awarded general contract to John W. Cowper Co., M. & T. Building, Buffalo, for two-story and basement plant, 322 x 580 ft., at Beacon, N. Y., for manufacture of folding boxes, cartons, etc., to cost about \$850,000 with machinery. Louis Werschung, Jr., is company architect, address noted; R. M.

Shankland, 101 Park Avenue, is engineer.

F. W. & H. G. Steinmetz, East Port Chester, N. Y., have filed plans for one-story machine shop, 45 x 100 ft., to cost about \$20,000 with equipment.

Lehigh Valley Railroad Co., 143 Liberty Street, New York, will build a coal storage and distributing plant at Jersey City, N. J., with mechanical unloading, conveying and other handling equipment. Upon completion, plant will be taken over and operated by Burns Brothers, 50 Church Street, New York.

Board of Education, Farmingdale, L. I., is said to be planning installation of manual training equipment in new three-story high school, to cost about \$325,000, for which it is expected to ask bids on general contract in March. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has plans for foundry addition at branch plant at Quincy, Ill.; also, for a two-story storage and distributing plant unit at same location, and for two-story office building, entire project to cost more than \$175,000 with equipment.

Union Wire Die Corporation, 250 West Fortieth Street, New York, has leased a floor in building at 333 West Fifty-second Street, for expansion.

DeForest Radio Co., 139 Franklin Street, Jersey City, N. J., manufacturer of radio equipment and parts, has leased plant of Brighton Mills, Passaic, N. J., totaling 250,000 sq. ft. floor space, and will remodel for new plant. Present factory at Jersey City will be continued.

American Oxygen Service Co., 225 West Thirty-fourth Street, New York, manufacturer of industrial oxygen, nitrogen, etc., has acquired property, 150 x 250 ft., at Harrison, N. J., as site for new plant, to cost more than \$60,000 with equipment.

Monroe Calculating Machine Co., Inc., 555 Mitchell Street, Orange, N. J., has acquired former factory of Vosburgh Miniature Lamp Co., on adjoining site and will equip for expansion.

Charles Shilowitz, Tube Concourse Building, Jersey City, N. J., architect, will soon begin superstructure for an eight-story automobile service, repair and garage building, to cost more than \$400,000 with equipment.

Eastern Aeronautical Co., care of Major George A. Vaughn, Jr., 14 South Munn Avenue, East Orange, N. J., head, will soon begin superstructure for a hangar at Newark Airport, Port Newark, Newark, with reconditioning and repair shop, to cost about \$35,000 including equipment.

Jewel Safe Desk Co., Jersey City, N. J., has leased floor in factory at Hutton Street and Webster Avenue, and will establish new plant.

Nash-Westwood Co., 311 Broadway, Westwood, N. J., local representative for Nash automobile, has plans for two-story service, repair and sales building, to cost about \$125,000 with equipment. B. F. McGuire, 416 Cedar Lane, Teaneck, N. J., is architect.

Horn Signal Mfg. Co., 290 Hudson

Street, New York, manufacturer of traffic signals, etc., is carrying out expansion program including machinery installation, and will establish division for manufacture of police and fire alarm signal equipment.

Atoz Packing Co., 109 Tichnor Street, Newark, N. J., has been organized to manufacture Atoz packing, a metallic material. Company has plant at above address and is in operation.

Foot Brothers Gear & Machine Co., Chicago, has opened Eastern sales office in Transportation Building, 225 Broadway, New York, in charge of E. A. Phillips.

Chicago

CHICAGO, Feb. 18.—The Chicago machine tool market is less active. Fresh inquiry, except for scattered needs of several railroads, has slackened and buying is well below the January rate. One farm implement manufacturer is holding up orders for machine tools while survey is being made of savings in production resulting from recent purchases. That buyers are still studying needs, however, is indicated by an increased number of show room visitors. Deliveries remain a factor in selling.

Santa Fe has added to its recent inquiries a 32-in. crank shaper, 18-in. lathe, three 3-in. x 24-in. double-end floor grinders, three radial drills, 24-in. shaper, 20-in. drill and a Bradley hammer. The Rock Island will buy a 10-ft. shear for ¾-in. plate and a 36-in. drill press, and a small Indiana railroad will purchase a driving wheel lathe. A Chicago radio manufacturer is expanding and is placing orders for machine tools. An electrical apparatus maker has purchased a 14-in. x 6-ft. lathe.

American Electric Fusion Corporation, Diversey Parkway, will build a two-story office and factory addition, 40 x 130 ft.

Chicago Foundry Co., 2028 North Major Avenue, Chicago, has awarded a contract for a two-story addition, 75 x 80 ft., to cost \$8,500.

Bryant Pattern Co., Shepherd and Highland Avenues, Chicago, has filed plans for a new factory, 80 x 90 ft., to cost \$18,000.

Schlangen Mfg. Co., Irving Park Boulevard and California Avenue, Chicago, manufacturer of builders' hardware, miscellaneous brass goods and barrel-filling machinery, will build an addition to cost \$225,000.

Empire Oil & Refining Co., 208 South La Salle Street, Chicago, has plans for new oil refinery on 145-acre tract at East Chicago, Ind., to cost about \$10,000,000 with machinery and pipe lines. Company is subsidiary of Cities Service Co., 60 Wall Street, New York.

Bell & Howell Co., 1801 Larchmont Avenue, Chicago, manufacturer of motion picture machinery, projectors, etc., will soon take bids on general contract for a two-story plant unit, to cost more than \$70,000 with equipment. Pond & Pond, Martin & Lloyd, 180 North Michigan Avenue, are architects.

Johnson & Meier Co., 646 North Michigan Avenue, Chicago, manufacturer of wrought iron products, has taken bids for a new one and two-story plant, to cost about \$40,000 with equipment. Harold E. Gallup, 646 North Michigan Avenue, is architect.

City Council, Le Sueur, Minn., has plans for extensions and improvements in municipal electric light and power plant, in-

The Crane Market

SELLERS of overhead cranes report a larger volume of inquiry in the past week than at any time since the first of the year. Inquiry for locomotive cranes is also increasingly active and one railroad has awarded a locomotive crane and ditcher and a standard railroad ditcher to a Middle Western builder. The list of 13 overhead traveling cranes for the General Steel Castings Co., Eddystone, Pa., is expected to be placed before March 1. An ash handling crane for the Hell Gate station of the New York Edison Co. is still pending.

Among the recent purchases are:

Stone & Webster, Inc., Boston, 75-ton power house crane for the Lynn Gas & Electric Co. from Northern Engineering Works.

Texas Oil Co., New York, 7½-ton portal crane for pier at Port Arthur, Tex., from unnamed seller.

Cerro de Pasco Copper Corporation, New York, 15-ton locomotive crane from Browning Crane Co.

McGregor-McIntyre Structural Steel, Ltd., Toronto, used 25-ton American locomotive crane from A. R. Gellinas, Montreal.

Dominion Bridge Co., Ltd., Lachine, Quebec, two used 25-ton American locomotive cranes and one used 30-ton Industrial locomotive crane for Sudbury, Ontario, from A. R. Gellinas.

Northern Pacific Railroad, 25-ton electric crane for delivery to Montana, from an unnamed bidder.

General Motors Corporation, Muncie Products Division, Muncie, Ind., two 10-ton, overhead electric cranes from unnamed bidder.

Pittsburgh Plate Glass Co., Pittsburgh, four 20-ton, 33-ft. span cranes from Cleveland Crane & Engineering Co., and 5-ton, 68-ft. span crane from a Western builder for its Crystal City, Mo., plant.

Youngstown Sheet & Tube Co., Youngstown, for its Indiana Harbor works, three 15-ton and two 5-ton, 26-ft. span cranes from Shaw Crane Works, and two 15-ton, 4-hook, three 15-ton 3-hook and two 20-ton 3-hook cranes, all 90-ft. span, from Morgan Engineering Co.

cluding installation of equipment, to cost about \$25,000. Ralph W. Richardson, Zenith Building, St. Paul, Minn., is engineer.

Pioneer Gravel Equipment Co., 2505 University Avenue, S. E., Minneapolis, Minn., manufacturer of sand and gravel plant equipment, has awarded general contract to Lindh-Gustafson-Klopfer Co., 315 Fifth Street, N. E., for one-story and basement plant, 180 x 200 ft., to cost about \$70,000 with equipment. A traveling crane will be installed. Sund & Dunham, Essex Building, are architects.

Common Council, Lamar, Colo., has plans for extensions and improvements in municipal electric light and power house, including installation of additional equipment, to cost about \$100,000. Wood & Weber, Midland Savings Building, Denver, are engineers.

Kalspell Refining Co., Kalspell, Mont., B. R. McAllister, head, has plans for enlargements and additional machinery, to cost more than \$75,000.

Johnson Motor Co., Waukegan, Ill., manufacturer of marine motors, has arranged for sale of 32,290 shares of common stock, part of proceeds to be used

for expansion. Company is operating branch assembling plant at Peterborough, Ont., and will arrange facilities for manufacture of parts, etc.

Municipal Utilities Co., Liberty Building, Des Moines, Iowa, has plans for one-story, steam-operated electric light and power house at Clarion, Iowa, to cost about \$150,000 with equipment.

New England

BOSTON, Feb. 18.—Sales of new tools are holding up well and in the past week included boring mills, planers and radial drills, lathes, drilling, grinding and milling machines, a few presses, punches and shears. The majority of new tools sold so far this month is for delivery to Massachusetts and Connecticut plants during the next four months. Local dealers report no new lists, but state that the number of one- and two-tool inquiries is encouraging. Sales of used tools in this territory have fallen off owing, in a large measure, to the few desirable tools available. Local dealers have many requisitions for various kinds of equipment from dealers outside New England, but are unable to fill orders.

L. G. Balfour & Co., 25 Country Street, Attleboro, Mass., jewelry manufacturers, have plans for an addition.

Consolidated Ashcroft Hancock Co., Inc., 11 Elias Street, Bridgeport, Conn., railroad tools and supplies, has started work on an addition.

Edison Electric Illuminating Co., 39 Boylston Street, Boston, has plans for a large power house at Everett, Mass.

Heppenstall Forge Co., 95 Howard Avenue, Bridgeport, Conn., has started construction of a machine shop, 60 x 200 ft. Fletcher Thompson, Inc., 542 Fairfield Avenue, Bridgeport, is engineer.

York Ice Machinery Corporation, 200 Causeway Street, Boston, engineer, is taking bids on a one- and one-half story artificial ice-making plant, 57 x 109 ft., for Pawtucket Ice Co., 126 Main Street, Pawtucket, R. I.

Herbert K. Allard, Edgewood district, Providence, R. I., has purchased Langleier Mfg. Co., Cranston, R. I., maker of swedging and automatic drilling machines. Mr. Allard will be president and treasurer, but otherwise personnel will remain the same.

Contract has been let by Patton-MacGuyer Co., Virginia Avenue and Baker Street, Providence, R. I., manufacturer of sheet metal stampings, etc., to C. I. Bigney Construction Co., 184 Washington Street, for one-story addition, 80 x 160 ft., to cost about \$50,000 with equipment.

John Morrell & Co., 75 Commercial Street, Boston, meat packers, have engaged Henschlen & McLaren, 1637 Prairie Avenue, Chicago, architects and engineers, to prepare plans for two-story and basement plant, 90 x 115 ft., at Cambridge, Mass., with refrigerating and other equipment, to cost \$100,000. Headquarters are at Ottumwa, Iowa.

George Coby, president, C. E. Mfg. Co., Inc., 702 Eddy Street, Providence, R. I., manufacturer of radio equipment, electrical apparatus, etc., is at the head of a company being organized to manufacture radio tubes and affiliated equipment. Former textile mill of Manville-Jencks Co., at Blackstone Avenue and Fountain Street, Pawtucket, R. I., has been taken over and will be remodeled.

Harvey C. Stutz Co. and Commercial

Aircraft Co., Bridgeport, Conn., are said to be arranging for merger under name of Stutz-Bellanca Co., and will expand to manufacture large three-motored aircraft and other airplanes. Joseph Cubelli, president of Commercial company, will head new organization.

Philadelphia

PHILADELPHIA, Feb. 18.—Property in West Philadelphia, bounded by Fifty-fourth and Fifty-sixth Streets, Gibson and Elmwood Avenues, 417 x 500 ft., has been purchased by Ford & Kendig Co., Fifteenth and Callowhill Streets, Philadelphia, manufacturer of pipe fittings, mill supplies, etc., and will be used for new plant. Plans will soon be drawn, to include one-story fabricating shop, storage and distributing buildings, and office, to cost more than \$300,000.

Pennsylvania Railroad Co., Philadelphia, has awarded general contract to Sinclair & Griggs, 1518 Walnut Street, for one-story machine shop at Greenwich Point, West Philadelphia, to cost about \$30,000 with equipment.

Board of Education, Keystone Building, Nineteenth Street, Philadelphia, is asking bids until March 5, for steel lockers and other equipment. Edward Merchant is secretary and business manager.

Philadelphia Electric Co., Tenth and Chestnut Streets, Philadelphia, is arranging fund of \$22,000,000 for extensions and improvements, including power substation at Thirty-eighth and Cuthbert Streets, West Philadelphia, to cost more than \$3,000,000; other power substations, additions to transmission lines and distributing system, and service and repair divisions. About \$7,500,000 will be used by Philadelphia Suburban-Counties Gas & Electric Co., for new switching plants, automatic power substations and transmission lines. Last noted is a subsidiary.

Progress Machine Co., Philadelphia, has awarded contract to James J. Clearkin, 1048 Pratt Street, for one-story machine shop.

William Charr, 1001 Chestnut Street, Philadelphia, architect, is completing plans for four-story automobile service, repair and garage building, to cost about \$140,000 with equipment.

Lanston Monotype Machine Co., Twenty-fourth and Locust Streets, Philadelphia, manufacturer of type-setting machinery, has acquired plant and business of Thompson Type Machine Co., 223 West Erie Street, Chicago, manufacturer of kindred equipment, and will consolidate. It is purposed to remove purchased plant to Philadelphia, where increased facilities will be provided for expansion.

Rundle Mfg. Co., Cleveland Avenue, Milwaukee, manufacturer of plumbing equipment and supplies, has asked bids on general contract for branch plant at Camden, N. J., to cost about \$1,000,000 with equipment. A. A. Wickland Co., 205 Wacker Drive, Chicago, is architect and engineer.

Rotary Piston Motor Co., Trenton, N. J., now being organized by Louis J. Pianarosa, 465 Chestnut Avenue, is planning establishment of local factory to manufacture aircraft motors and parts. Mr. Pianarosa will be treasurer and general manager.

Scranton Board of School Control, 425 Washington Avenue, Scranton, Pa., is asking bids on general contract until March 11 for four-story addition to tech-

nical and manual training high school, to cost \$500,000 with equipment. A. J. Ward, Scranton-Lackawanna office building, is architect; Tudor Williams, Scranton Life Building, is supervising architect.

Superior Welding Co., 423 Green Ridge Street, Scranton, Pa., is considering one-story addition, to cost about \$25,000 with equipment.

Milwaukee

MILWAUKEE, Feb. 18.—Reports concerning machine-tool business are optimistic. Builders have not been able to make much headway in balancing output with demand because of the continued heavy call for equipment. Orders are from widely diversified sources and include tools for extensions to capacity as well as for replacement. Used equipment is moving relatively well, particularly the lighter types.

Milwaukee Corrugating Co., Thirty-sixth Avenue and Burnham Street, Milwaukee, will spend about \$200,000 in enlarging plant of Eller Mfg. Co., Canton, Ohio, recently acquired. About 50,000 sq. ft. will be added. Inquiry is being made for equipment for manufacturing metal lath and other building materials, rain-spouts, furnace and stove pipe, metal ceilings and roofing. Louis Kuehn is president.

Argonaut Realty Co., General Motors Building, Detroit, is about to place contracts for a new sales and service station, 127 x 245 ft., for Milwaukee branch of General Motors Truck Corporation, now located at 441 Jackson Street. It will cost about \$175,000 complete.

Wisconsin Valley Electric Co., 206 Third Street, Wausau, Wis., which recently acquired municipal hydroelectric generating plant at Eagle River, Wis., will make improvements and additions, and build 125 miles of new transmission lines at a cost of \$500,000. Harold L. Gelsse is secretary and general manager.

Fish Rotary Oven Co., Walworth, Wis., manufacturer of bakery equipment, will start work March 1 on new factory, 100 x 260 ft., at Beloit, Wis. The investment will be about \$100,000.

J. A. Schindler, city clerk, Marshfield, Wis., closes bids March 4 for construction and equipment of a municipal garbage incinerator, consisting of two 7½-ton units.

Announcement is made of merger of Industrial Controller Co., 306 Hanover Street, Milwaukee, with Square D Co., Detroit, which also has acquired a plant in Peru, Ind., and one in Canada. A new corporation is being organized. Charles Gale Welch, president, and Francis W. Magin, secretary and general manager of Industrial company, will become directors of new organization. A three-story addition, 50 x 140 ft., is under construction.

Buffalo

BUFFALO, Feb. 18.—Plans are under consideration by Northern New York Utilities, Light and Power Building, Watertown, N. Y., affiliated with St. Regis Paper Co., same address, for hydroelectric power plant on Raquette River, near South Colton, vicinity of Potsdam, N. Y., to include power dam 50 ft. high and 1000 ft. long, and station with initial output of 12,800 hp. to be increased later to 38,400 hp., to cost more than \$500,000 with transmission lines.

Power will be used largely for paper mill operation.

Buffalo Pressed Steel Co., Inc., and Buffalo Body Corporation, manufacturer of automobile bodies, plan rebuilding joint plant at 500 Smith Street, Buffalo, partly destroyed by fire Feb. 12.

Kurtz-Chevrolet Corporation, 2301 Main Street, Buffalo, Fred P. Kurtz, president, local representative for Chevrolet automobile, has asked bids on revised plans for one and two-story service, repair and sales building, to cost about \$120,000 with equipment. Bacon & Lurkey, 997 Main Street, are architects.

Solvay Process Co., Solvay, N. Y., has acquired tract of 119 acres of limestone properties near Chaumont, N. Y., and is said to be planning early development for raw material supply.

Buffalo Ornamental Bronze & Iron Works, Buffalo, recently formed with capital of \$50,000 by W. G. Hickman, 6 Granger Place, and associates, plans operation of local factory for architectural and ornamental iron, bronze and other metal specialties. William J. Schabel, 604 Goodyear Avenue, is also interested in company.

Board of Education, Genesee Building, Buffalo, is asking bids on revised plans until Feb. 28 for construction of Burgard vocational school, to cost more than \$750,000 with equipment. Bureau of School Architecture, address noted, is architect. James Storer is secretary.

South Atlantic

BALTIMORE, Feb. 18.—Western Electric Co., 195 Broadway, New York, has leased property at Canton, Baltimore, for temporary plant, pending construction of permanent factory for which contract recently was let to H. K. Ferguson Co., Cleveland, initial unit to cost more than \$10,000,000 with machinery. Leased property will be occupied for manufacture of telephone wire. William H. Meese is vice-president, in charge.

Perfect Circle Co., Hagerstown, Md., manufacturer of piston rings, will soon begin superstructure for three-story addition, 60 x 100 ft., to cost about \$50,000, and will equip primarily for storage and distributing service. Later, company expects to build new unit to manufacturing division.

Phillips Fertilizer Co., Washington, N. C., plans one-story addition, 120 x 200 ft., to cost more than \$40,000 with equipment.

Appalachian Electric Power Co., Roanoke, Va., is completing plans for new hydroelectric power house on New River, near Radford, Va., with initial capacity of 80,000 kw., to cost \$11,000,000 with transmission lines, switching stations and auxiliary structures.

American Tobacco Co., Durham, N. C., has approved plans for new power house at local factory, to cost about \$325,000 with equipment. J. E. Sirrine & Co., Greenville, N. C., are engineers.

Board of Trustees, Agnes Scott College, Decatur, Ga., will soon take bids for a new power plant and mechanical laundry, to cost about \$100,000 with equipment. Robert & Co., Bona Allen Building, Atlanta, Ga., are engineers.

Chesapeake Corporation, Westpoint, Va., is considering expansion in pulp and paper mill, including installation of additional equipment for sulphate pulp production, to cost more than \$200,000.

Edward Katzinger Co., 1949 North Cicero Avenue, Chicago, manufacturer of bakers' tinware, tools, etc., will defer

award of contract for branch plant at Baltimore for about 60 days. It will be two stories, 145 x 180 ft., to cost about \$250,000 with machinery. Lockwood, Greene Engineers, Inc., 400 North Michigan Avenue, Chicago, is architect and engineer.

Auto-Car Sales & Service Co., Charlotte, N. C., has awarded general contract to Southeastern Construction Co., 210 West Second Street, for two-story service, repair and sales building, L-shaped, 50 x 160 ft. and 50 x 170 ft., to cost about \$100,000 with equipment. Lockwood, Greene Engineers, Inc., Charlotte, is architect and engineer.

In connection with its expansion program, Chesapeake & Ohio Railroad Co., Richmond, Va., has authorized additional funds of \$207,000 for repair shops and certain track work at Hinton, Va., and vicinity, and \$330,000 for engine terminal improvements, including shop facilities, in same district; \$690,000 for new engine house, terminal, shop facilities and kindred expansion at Clifton Forge, Va.; and rail-sawing plant at Barboursville, W. Va., to cost \$50,000 with equipment.

Columbus Electric & Power Co., Columbus, Ga., is arranging for increase in preferred stock from \$6,500,000 to \$10,500,000, part of proceeds to be used for expansion.

St. Louis

ST. LOUIS, Feb. 18.—Plans are being considered by Alco Valve Co., 5811 Manchester Avenue, St. Louis, for one-story unit, to cost about \$40,000 with equipment. R. L. Sparks is vice-president.

City Council, Columbia, Mo., will take bids in March for extensions and improvements in municipal electric light and power plant, including installation of 5000-kva. turbo-generator unit, condenser, switchboard and auxiliary equipment. Burns & McDonnell Engineering Co., Interstate Building, Kansas City, Mo., is engineer.

Wheatley Brothers Brass & Machine Works, 24 North Owasso Street, Tulsa, Okla., is considering one-story machine shop, to cost about \$30,000 with equipment.

H. F. Wilcox Oil & Gas Co., Tulsa, Okla., operating an oil refinery at Bristow, Okla., has disposed of bond issue of \$2,000,000, part of proceeds to be used for expansion.

Southwestern Bell Telephone Co., Telephone Building, St. Louis, has revised plans for two-story addition to equipment storage and distributing plant, including repair facilities, and garage unit, to cost about \$85,000 with equipment. I. R. Timlin, address noted, is company architect.

Transcontinental Air Transport, Inc., St. Louis, care of Love-Sultan, 6625 Delmar Boulevard, architect, has plans for hangars, repair and reconditioning shops and other units at Columbus, Ohio; Los Vegas, N. M.; Kingman and Winslow, Ariz., in connection with transcontinental airline, each unit to cost about \$50,000 with equipment.

Shell Petroleum Corporation, Shell Building, St. Louis, is planning to rebuild part of oil refinery at Roxana, Okla., destroyed by fire Feb. 8.

Stearman Aircraft Co., 601 East Thirty-fifth Street, Wichita, Kan., Lloyd Stearman, head, is completing plans for hangar, 75 x 130 ft., with repair facilities, at municipal airport, to cost about \$35,000 with equipment. Schmidt, Boucher & Overend, Brown Building, are architects.

City Council, Tonkawa, Okla., is planning extensions and improvements in municipal electric light and power plant, including installation of equipment, to cost over \$100,000.

Banfield Packing Co., 204 East Third Street, Tulsa, Okla., plans installation of conveying and other handling equipment, refrigerating apparatus, etc., in three-story addition, 75 x 150 ft., to meat-packing plant, to cost about \$200,000.

St. Louis Air Terminals, Inc., has been incorporated with \$1,000,000 capital stock to develop and operate a 425-acre airport south of East St. Louis, Ill. One-fourth interest is owned each by Transcontinental Air Transport, which will use airport for its St. Louis station in coast-to-coast service, and Curtiss Flying Service, which will establish a flying school there and also operate an inter-city aerial taxi service. Plans call for expenditure of \$500,000 for hangars, flying school, passenger stations, supply shops and other buildings.

Guardian Aircraft Co., Derek White and Richard Hardin, managers, has been organized at St. Louis, and has leased a factory at 2500 Texas Avenue, containing 8500 sq. ft. of floor space, which is being equipped to manufacture two-passenger monoplanes.

South Side Machine Co., 4016 Nebraska Avenue, has purchased one acre of ground on Missouri Pacific tracks between Eller and Eichelberger Streets, St. Louis, on which a one-story machine shop, containing 10,000 sq. ft. of floor space, will be erected. New building will cost \$40,000 and will be about one-third larger than shop now occupied. Henry Lindel is president.

B. & N. Ring Mfg. Co., Simeon A. Bowman, president, has been incorporated to manufacture piston rings, and has established a plant at 4227 Duncan Avenue, St. Louis, containing 3500 sq. ft. of floor space.

Allsup Mfg. Co., 6300 Wells Avenue, St. Louis, Allen R. Allsup, president, has been incorporated to manufacture laundry machinery and has factory containing 2500 sq. ft. of floor space.

East St. Louis Casting Co., Sixteenth and Kansas Streets, East St. Louis, Ill., will erect a new one-story foundry, 110 x 240 ft., which will triple present capacity. Building and equipment will cost about \$200,000.

Harnischfeger Sales Corporation, Milwaukee, distributor for Harnischfeger Corporation, has removed St. Louis office from 524 Buder Building to 791 Arcade Building. L. F. Lincoln remains in charge.

Detroit

DETROIT, Feb. 18.—Plans are being considered by Service Castor Truck Co., 509 North Albion Street, Albion, Mich., for one-story addition, to cost \$25,000 with equipment.

Consumers Power Co., Jackson, Mich., is arranging an expansion program to cost close to \$12,000,000 for electric light and power division. Work will include installation of two new generating units in steam-operated plant on Saginaw River; new equipment in steam-operated electric station at Grand Rapids; installation of generating unit and auxiliary equipment at hydroelectric power plant at Lyons; construction of steel tower transmission line from Saginaw River plant to Flint and vicinity, and other work. In gas division, company will use about \$4,300,000 for similar projects, including increase in gas generating plants.

Charles W. Tippy is vice-president and general manager.

Board of Trustees, Detroit House of Correction, Detroit, has plans for a two-story furniture factory at Northville institution, to cost about \$90,000 with machinery. Albert Kahn, Marquette Building, is architect and engineer.

Marine Wire Co., Barclay and Western Streets, Muskegon, Mich., has awarded general contract to Strom Construction Co., 148 Ottawa Street, Grand Rapids, Mich., for two-story addition, to cost about \$40,000 with equipment. Edward E. Valentine, Union National Bank Building, Muskegon, is architect. E. C. Farmer is secretary.

Alloy Steel Spring & Axle Co., Jackson, Mich., is arranging for a sale of common stock to total about \$237,500, part of fund to be used for extensions and improvements.

Cadillac Motor Car Co., 2860 Clark Avenue, Detroit, has awarded general contract to A. A. Albrecht, Penobscot Building, for addition, to cost about \$125,000 with equipment.

Checker Cab Co., Kalamazoo, Mich., manufacturer of taxicabs, is said to be planning new factory unit, to cost more than \$50,000 with equipment.

Chrysler Corporation of Canada, Ltd., a subsidiary of Chrysler Corporation, Detroit, manufacturer of automobiles, has awarded general contract to Walbridge Aldinger Co., Penobscot Building, Detroit, for power plant at Walkerville, Ont., to cost about \$115,000 with equipment.

Burroughs Adding Machine Co., 6071 Second Avenue, Detroit, is said to be planning call for bids for a one-story addition, 60 x 175 ft., to cost about \$50,000 with equipment. Albert Kahn, Marquette Building, is architect and engineer.

Barnes-Gibson-Raymond, Inc., 6400 Miller Avenue, Detroit, spring manufacturer, has acquired plant of Cook Spring Co., Ann Arbor, Mich., which it will operate as Cook Spring Co. Division, continuing Detroit plant as Detroit Division. A. J. Donally has retired from presidency of Cook company. Purchasing and cost departments will be combined, but otherwise each plant will be conducted individually with probable merging of engineering facilities. Lyman D. Adams is president and general manager.

Cincinnati

CINCINNATI, Feb. 18.—Machine tool bookings in the first half of February closely approximated the volume of the last two weeks of January. While no large orders have been reported by local builders in the past seven days, sales have been made to companies in practically every industry using machine tools. Distribution of this business is country-wide, but the largest percentage of orders originated in the Detroit district.

Demand from foreign sources is also of interest. A French automobile manufacturer has contracted for a substantial number of special lathes, while pending business in Russia is said to be of large proportions.

Making deliveries within a reasonable time is a major problem for local machine tool companies. One large builder is reported to have solved the problem to some extent by working its forces in several departments on two 12-hr. shifts, thus maintaining continuous operations until this acute situation is relieved. Or-

dinarily these departments are on a daily schedule of two 8-hr. shifts.

American Laundry Machinery Co., Norwood, Ohio, has purchased Schramm Mfg. Co., St. Louis, manufacturer of laundry specialty machinery, which it will operate as a branch. A. O. Schramm will remain in charge of operations at St. Louis.

Central Brass & Fixture Co., Springfield, Ohio, was damaged by fire the past week. Immediate replacement of equipment is contemplated.

Contract has been let by Monarch Marking System Co., 216 South Torrence Street, Dayton, Ohio, manufacturer of price-marking machinery, to Danis-Hunt Co., Dayton, for addition to cost about \$85,000 with equipment. Schenck & Williams, 32 North Main Street, are architects.

City Council, Russellville, Ky., has acquired about 60 acres on Dixie Highway and plans establishment of municipal airport, including hangars, repair shops and other buildings, to cost more than \$50,000.

Cambridge Tile Mfg. Co., Woodburn Street, Covington, Ky., plans one-story plant at Hartwell, Cincinnati, to cost more than \$800,000 with machinery. Bert L. Baldwin, 1206 Second National Bank Building, Cincinnati, is architect and engineer.

Cincinnati Sheet Metal & Roofing Co., 1226 East Front Street, Cincinnati, has asked bids on general contract for plant extensions and improvements, to cost about \$70,000. Howard McCloy, Bank of Commerce Building, is architect.

Dixie Foundry Co., Cleveland, Tenn., is planning to rebuild part of foundry recently destroyed by fire with entirely new unit, to cost more than \$35,000 with equipment.

Aeronautical Corporation of America, Inc., Chamber of Commerce Building, Cincinnati, is asking bids on general contract until March 5 for one-story parts manufacturing and assembling plant at Lunken airport, 80 x 308 ft., to cost more than \$100,000 with equipment. H. Neilsen Jackson, Mercantile Library Building, is architect.

Vester Motor Co., Knoxville, Tenn., has plans for one-story parts and mechanical shop addition, 75 x 150 ft., to cost about \$50,000 with equipment.

Board of Education, Newark, Ohio, is said to be planning installation of manual training equipment in first unit of new junior high school in West End section, to cost \$150,000, for which bids are being asked on general contract until March 1. Vernon Redding & Associates, Walpark Building, Mansfield, Ohio, are architects.

Pittsburgh

PITTSBURGH, Feb. 13.—Machine tool business is good and, although it has not reached the volume and monetary value that some in the trade had expected, there is a fairly constant flow of orders. The Westinghouse Electric & Mfg. Co. has been buying steadily against its first quarter list, about two-thirds of which now has been placed.

A. M. Byers Co. has bought a 40-in. blooming mill for its new plant at Ambridge from United Engineering & Foundry Co., Pittsburgh, and it will probably place the universal skelp mill in the next few days.

Homestead Aircraft, Inc., McClure Street and Third Avenue, Homestead, Pa., has been organized to manufacture small airplanes. G. W. Murphy is president; G. A. Schryver, vice-president; L. S. An-

derson, secretary, and Earl C. Dean, treasurer.

Bids have been asked on general contract by Kerotest Mfg. Co., 2525 Liberty Avenue, Pittsburgh, manufacturer of steel and brass valves, etc., for three-story addition, with machine shop, to cost about \$100,000 with equipment. J. T. Steen & Son, Vandergrift Building, are architects.

East Liberty Garage Co., 6014 Penn Avenue, Pittsburgh, has plans for six-story service, repair and garage building, 100 x 145 ft., to cost more than \$300,000 with equipment. N. F. Arble, 620 Second Avenue, is architect.

Monongahela West Penn Public Service Co., Fairmont, W. Va., has plans for two-story equipment storage and distributing plant at Clarksburg, W. Va., with service and repair departments, to cost more than \$75,000. Company will also build new transmission line in Parkersburg district to cost about \$45,000.

Armstrong Cork Co., Twenty-fourth Street, Pittsburgh, is reported planning addition to cost more than \$500,000 with equipment. C. D. Armstrong, Jr., is official of company, in charge.

Fawcus Machine Co., Pittsburgh, has been formed with 2500 shares of stock, no par value, to take over and expand company of same name, with plant at 2818 Smallman Street, manufacturer of cut gears, etc. New organization will produce forgings, castings and other kindred products. S. C. Dalbey, 2925 Berkshire Road, Cleveland, is treasurer.

Pittsburgh & Lake Erie Railroad Co., Pittsburgh, is said to be arranging a fund of about \$1,000,000 for expansion in warehouse and freight facilities in this district, including new buildings and installation of elevating, conveying and other mechanical handling equipment. Work is scheduled to begin in spring.

Gulf States

BIRMINGHAM, Feb. 13.—Bids will be received by Board of Water Commissioners, Dallas, Tex., until March 15 for equipment for waterworks pumping plant, covering alternate proposals for Diesel or gas engine generator sets and switchboard; motor-driven pumping units, switchboard, controls, etc.; steam turbine pumping units; turbo-generators, switchboard and certain motor-driven pumps, with accessories; steam boilers; steam power plant piping and auxiliaries, and crane. Plans at office of J. B. Winder, chief engineer of water supply division; and office of Fuller & McClintock, 170 Broadway, New York, consulting engineers.

City Council, Colorado, Tex., has purchased three-acre tract and plans municipal airport, including hangar, repair and reconditioning shop, to cost about \$40,000 with equipment.

Board of Education, 2015 Park Avenue, Birmingham, is said to be planning installation of manual training equipment in three-story high school to cost more than \$200,000, for which bids will soon be asked on general contract. Warren, Knight & Davis, Protective Life Building, are architects.

Missouri Pacific Railroad Co., St. Louis, and Houston, Tex., has awarded general contract to Orange Car & Steel Co., Orange, Tex., for one-story car and coach repair shop, 150 x 240 ft., with bay extension, 50 x 125 ft., at Kingsville, Tex., to replace shop units recently destroyed by fire, to cost about \$150,000 with equip-

ment. A 15-ton traveling crane and other equipment-handling machinery will be installed.

Baton Rouge Electric Co., Baton Rouge, La., is disposing of a bond issue of \$1,000,000, part of proceeds to be used for extensions and improvements in plants and system.

A. C. Burton & Co., Inc., 1402 Main Street, Houston, Tex., local representative for Chrysler automobile, plans call for bids for new service, repair and sales building, to cost more than \$200,000 with equipment. Joseph Finger, Keystone Building, is architect.

El Paso Electric Co., El Paso, Tex., is arranging appropriation of about \$3,000,000 for extensions and improvements in generating plants, including additional machinery and transmission facilities. F. J. Gannon is general manager.

Cudahy Packing Co., Birmingham, is planning to rebuild part of local meat-packing plant, recently destroyed by fire. Headquarters are at Union Stock Yards, Chicago.

Maverick County Water Improvement District No. 1, Eagle Pass, Tex., has received authority to arrange for bond issue of \$1,800,000 for hydroelectric generating plant and irrigation system. Plans will soon be drawn.

Union Utilities, Inc., El Paso, Tex., operating natural and artificial gas properties in Texas, Oklahoma, Idaho and Oregon, has arranged for bond issue of \$1,300,000, part of fund to be used for expansion, including pipe line construction.

Alabama Coca-Cola Bottling Co., Anniston, Ala., plans installation of automatic bottling equipment, conveying machinery and other mechanical apparatus in proposed plant, 50 x 220 ft., to cost about \$100,000 with equipment.

City Council, Winnfield, La., has plans for municipal water works and electric light and power plant, to cost about \$125,000 with equipment. Swanson-McGraw, Inc., Balter Building, New Orleans, is engineer.

Universal Mills, Inc., Riverside, Fort Worth, Tex., plans new eight-story flour mill and grain elevator, latter with capacity of 200,000 bu., with elevating, conveying, screening and other equipment, to cost about \$250,000. Gaylord J. Stone is head.

Hartsfield Steel Co., Birmingham, has been organized with capital of \$30,000 to establish plant to manufacture steel barrels, drums and containers. Details have not yet been announced. Wallace Hartsfield is president and general manager. Temporary offices have been opened at 423 Comer Building.

Indiana

INDIANAPOLIS, Feb. 13.—Indiana Refining Co., Lawrenceville, Ill., is completing plans for two-story storage and distributing plant at Terre Haute, to cost about \$60,000 with equipment.

Aladdin Industries, Inc., 609 West Lake Street, Chicago, manufacturer of vacuum bottles and kindred products, is considering an addition to plant at Alexandria, to cost more than \$40,000 with equipment.

Electric Sprayit Co., Stephenson Building, South Bend, Simon Deutsch, president, manufacturer of spraying equipment, etc., contemplates a one-story addition to plant in Belleville section, to cost about \$45,000 with equipment.

Studebaker Mail Order Corporation, South Bend, has acquired plant and business of Collin B. Kennedy, Inc., High-

land, Ill., manufacturer of radio sets and equipment. Company is being formed under name of Colin B. Kennedy Corporation, capitalized with 30,000 shares of stock, no par value, to take over property. A plant has been leased at South Bend, totalling about eight acres of floor space and Highland factory will be removed to new location, with installation of additional equipment for increase in output. Colin B. Kennedy is president of new corporation.

Nusbaum Novelty Co., Berne, manufacturer of toys, etc., plans rebuilding part of plant destroyed by fire Feb. 6.

Citizens' Committee in charge of municipal electric light and power plant at Richmond, is considering extensions and improvements in station, with installation of additional equipment, to cost more than \$350,000. D. C. Hess is manager.

Davis Aircraft Corporation, Richmond, has been organized to manufacture small airplanes and has purchased Vulcan Aircraft Co., Portsmouth, Ohio, maker of American Moth plane. Capt. Walter C. Davis heads new corporation.

Barclay Mfg. Co., Muncie, has been incorporated to continue manufacture of sheet metal specialties, stampings, tools and dies, and plans to enlarge factory soon.

Pacific Coast

SAN FRANCISCO, Feb. 14.—Contract has been let by Samson Tire & Rubber Co., 733 East Eighth Street, Los Angeles, to J. V. McNeil Co., 5860 Avalon Boulevard, for one-story plant, 265 x 1350 ft., with machine shop, boiler house and other structures, to cost over \$500,000 with equipment. Morgan, Walls & Clements, Van Nuys Building, are architects.

Pickering Lumber Co., 307 West Eleventh Street, Kansas City, Mo., has plans for a new mill in Modoc County, near Alturas, Cal., to include machine shop, boiler house and other units, to cost over \$2,000,000 with equipment.

Douglas Aircraft Co., Santa Monica, Cal., has awarded general contract to L. B. Norman, 1323 Georgia Avenue, for one-story addition at Clover Field, to cost \$60,000 with equipment.

United States Electrical Mfg. Co., 200 East Slauson Avenue, Los Angeles, has plans for one-story addition, 30 x 220 ft., to cost about \$40,000 with equipment. Hamm, Grant & Bruner, Inc., Ferguson Building, is architect and engineer.

Flr-Tex Insulating Board Co., San Francisco, now building a mill at St. Helens, Ore., to cost more than \$1,000,000 with machinery, is planning sale of stock issue to total \$500,000, proceeds to be used for mill project and other expansion.

Olympia Veneer Co., Olympia, Wash., is planning extensions and improvements in mill, including electrification of part of works, new units and additional equipment, to cost \$100,000.

Christmas Copper Co., Christmas, near Miami, Ariz., has plans for a new stamp mill, to cost about \$125,000 with machinery. Southwestern Engineering Co., Hollingsworth Building, Los Angeles, is engineer.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has approved plans for pipe line for natural gas transmission from Button Willow and Kettleman Hills district, in central part of State, to San Francisco and vicinity, totalling about 250 miles, to cost \$13,000,000. Company is arranging for sale of stock for \$7,000,000 to provide for immediate work, and

will carry out additional financing later. Storage facilities will be built at San Francisco and Oakland.

American Hoist & Derrick Co., St. Paul, Minn., maker of hoisting machinery and crawler-type shovel-cranes, has opened branch office at 139 Townsend Street, San Francisco, and will carry stock of new equipment and parts. Establishment of this office terminates connection with Harron, Ricard & McCone, who have handled American line in San Francisco for many years. Boyd Nixon is in charge of new office.

Canada

TORONTO, Feb. 18.—Machine tool inquiry continues good and dealers and builders report a steady call for one and two tool units. A strong demand for equipment has developed for mining operations. Sales of woodworking tools have improved.

Eastern Rubber Co., Acton Vale, Quebec, will start work in April on a two-story addition, 40 x 50 ft.

Babcock-Wilcox & Goldie McCulloch, Ltd., 64 Grand Avenue, Galt, Ont., maker of steam power plant equipment, etc., is planning extensions, work to be started in spring.

Hull Match Co., care of E. Paquette, Hull, Quebec, is planning for erection of a factory to cost \$100,000.

Dominion Oilcloth & Linoleum Co., Ltd., 2192 St. Catharine Street, Montreal, is having plans prepared by Hutchison & Wood, 204 Notre Dame Street West, for new factory.

McKinnon Industries, Ltd., St. Catharines, Ont., has purchased adjoining property and contemplates an addition.

Goderich Elevator Co., Goderich, Ont., will build an addition and install new equipment in power plant.

Town Council, Swansea, Ont., has authorized construction of a sewage disposal plant, purchase of equipment, etc., to cost \$125,000.

Western Canada

Western Steel Products, Ltd., Regina, Sask., is having plans prepared by Storey & Van Egmond, McCallum Hill Building, for plant addition, 100 x 100 ft.

City engineer's department, Edmonton, Alberta, and J. Martland, are preparing plans for a sewage disposal plant to cost \$50,000.

Cleveland

CLEVELAND, Feb. 18.—Machine tool business was good the past week. The Hupp Motor Car Corporation, Detroit, purchased 37 machines for crank shaft equipment for the Atlas Mfg. Co., Fostoria, Ohio, a subsidiary of the Chandler-Cleveland Motors Corporation, which was recently taken over by the Hupp Corporation. The orders included 12 LeBlond crank shaft lathes, aggregating about \$200,000, 10 Norton line bearing grinding machines, two Norton crank shaft lapping machines and 13 Landis crank pin grinding machines. The Hupp corporation will manufacture a line of popular priced motor cars in the two Cleveland plants of the Chandler-Cleveland Corporation and it is expected that it will purchase some equipment for these plants.

Manufacturers and dealers are receiv-

ing a good volume of single tool orders. Demand for turret lathes is holding up well in single machines, although one order for three machines was placed with a Cleveland manufacturer during the week by the Stewart-Warner Speedometer Corporation, Chicago.

Eaton Axle & Spring Co., Cleveland, is enlarging its automobile bumper plant at Central Avenue and East Sixty-fifth Street by erection of two one-story buildings, 40 x 200 ft. and 50 x 130 ft., respectively, which will be used for forging and finishing departments. This company has purchased gasoline cap manufacturing division of Monmouth Products Co., 882 East Seventy-second Street, which will be consolidated with Easy-On Cap Co., branch of the Eaton company, which was recently acquired.

Cleveland Institution of Aviation, Inc., Union Terminal Building, Cleveland, is said to be planning new hangar, with reconditioning and repair facilities, to cost about \$90,000 with equipment. P. H. Mitchell is in charge.

Board of Education, Euclid and Shaw Avenues, Cleveland, has asked bids on general contract for two-story equipment storage and distributing plant, with service and repair facilities, 60 x 100 ft., to cost \$50,000 with equipment. H. M. Morse Co., Finance Building, is architect.

Goodyear Tire & Rubber Co., Akron, Ohio, has authorized sale of additional block of common stock to total about \$25,840,000, part of proceeds to be used for expansion, including new mill at Gadsden, Ala., to cost more than \$5,000,000, and other development. Contract for Gadsden mill has been let to Adams Construction Co., Atlanta, Ga.

Foreign

AVIATION Department, Ministry of War and Marine, Mexico City, Mexico, Brig. Gen. Juan F. Azcarate, head, is planning expansion at aircraft manufacturing plants. Government School of Applied Aeronautics, under direction of department, will be reorganized and enlarged.

American & Foreign Power Co., subsidiary of Electric Bond & Share Co., 2 Rector Street, New York, has arranged for purchase of electric light and power properties of Atlas Light & Power Co., Ltd., in Argentina, for about \$42,500,000. Expansion is planned, including additional generating facilities and transmission lines. Acquisition also includes a number of electric traction lines.

Berlin City Electric Co., Berlin, Germany, is disposing of bond issue of \$15,000,000 in United States, part of proceeds to be used for expansion in power plants and transmission lines. Company is controlled and operated by city of Berlin.

Kuhlmann Co., Paris, France, manufacturer of commercial fertilizers, industrial chemicals, etc., with branch plants throughout republic, is arranging for increase in capital from 250,000,000 to 300,000,000 fr., part of proceeds to be used for expansion in output.

General Motors Corporation, Detroit, is reported completing negotiations for acquisition of interest in Opel Works, Rueselheim, near Frankfurt-on-Main, Germany, and will develop larger part of plant for manufacture of new six-cylinder Chevrolet automobiles, with capacity to furnish all trade on the continent. Opel company, it is stated, will limit manufacture to small cars to seat two persons.

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